



**Technical Support Document for the  
Draft Fifth Contaminant Candidate List  
(CCL 5) -  
Contaminant Information Sheets**

Office of Water (4607M)  
EPA 815-R-21-006  
July 2021  
[www.epa.gov/safewater](http://www.epa.gov/safewater)

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## Abbreviations and Acronyms

|        |                                                                       |
|--------|-----------------------------------------------------------------------|
| CASRN  | Chemical Abstract Services Registry Number                            |
| CCL    | Contaminant Candidate List                                            |
| CCL 1  | EPA's First Contaminant Candidate List                                |
| CCL 2  | EPA's Second Contaminant Candidate List                               |
| CCL 3  | EPA's Third Contaminant Candidate List                                |
| CCL 4  | EPA's Fourth Contaminant Candidate List                               |
| CCL 5  | EPA's Fifth Contaminant Candidate List                                |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CIS    | Contaminant Information Sheet                                         |
| CSF    | Cancer Slope Factor                                                   |
| DTXSID | DSSTox Substance Identifier                                           |
| FIFRA  | Federal Insecticide, Fungicide, and Rodenticide Act                   |
| EEC    | Estimated environmental concentrations                                |
| EDWC   | Estimated drinking water concentrations                               |
| fHQ    | Final Hazard Quotient                                                 |
| HRL    | Health Reference Level                                                |
| KH     | Henry's Law Constant                                                  |
| Kow    | Octanol-Water Partition Coefficient                                   |
| LOAEL  | Lowest Observed Adverse Effect Level                                  |
| NPDWR  | National Primary Drinking Water Regulation                            |
| NHANES | National Health and Nutrition Examination Survey                      |
| NOAEL  | No Observed Adverse Effect Level                                      |
| OPP    | Office of Pesticide Programs                                          |
| OW     | Office of Water                                                       |
| PWS    | Public Water System                                                   |
| PCCL   | Preliminary Contaminant Candidate List                                |
| QSAR   | Quantitative Structure-activity Relationship                          |
| SDWA   | Safe Drinking Water Act                                               |
| SL     | Screening Level                                                       |
| USEPA  | United States Environmental Protection Agency                         |

## Chapter 1 Introduction

Section 1412(b)(1)(B)(i) of the Safe Drinking Water Act (SDWA), as amended in 1996, requires the United States Environmental Protection Agency (EPA) to publish every five years a list of drinking water contaminants which are not subject to any proposed or promulgated National Primary Drinking Water Regulations (NPDWRs), are known or anticipated to occur in public water systems (PWSs), and may require regulation under the SDWA. This list is known as the Contaminant Candidate List, or CCL. The SDWA directs the agency to consider health effects and occurrence information for unregulated contaminants to identify those that present the greatest public health concern related to exposure from drinking water. EPA uses this list of unregulated contaminants to help identify priority contaminants for regulatory decision making and to prioritize research and data collection efforts.

EPA followed a 3-step process to identify chemicals for inclusion on the Draft CCL 5. These steps included:

**Step 1.** Building a broad universe of potential drinking water contaminants (called the CCL 5 Chemical Universe). EPA evaluated 134 data sources and identified 43 that were related to potential drinking water chemical contaminants and met established CCL assessment factors. From these data sources, EPA identified and extracted occurrence and health effects data for the 21,894 chemicals that form the CCL 5 Chemical Universe.

**Step 2.** Screening the CCL 5 Chemical Universe to identify a list of chemicals that should be further evaluated (called the Preliminary CCL 5 (PCCL 5)). EPA established and applied a data-driven screening points system to identify and prioritize a subset of chemicals with the greatest potential for public health concern. The agency also incorporated publicly nominated chemicals to the PCCL 5.

**Step 3.** Classifying PCCL 5 chemicals to select the Draft CCL 5 chemicals. EPA compiled occurrence and health effects information and imported it into a standardized document format, called the Contaminant Information Sheet (CIS). The agency provided the CISs for use by two evaluation teams of EPA scientists. The evaluation teams reviewed this information for each chemical before reaching a group decision on whether to list a chemical on the Draft CCL 5.

A more detailed description of the processes used to develop the Draft CCL 5 of chemicals using these steps can be found in the Technical Support Document for the Draft Fifth Contaminant Candidate List (CCL 5) - Chemical Contaminants<sup>1</sup>.

The purpose of this document is to present the CISs and relevant information that helps readers understand the data provided in the CISs. The remainder of this document is organized as follows: Chapter 2 presents an overview of the Draft CCL 5 CISs; Chapter 3 provides a graphic illustration, also known as the CIS Key, to assist with interpretation of the data on the CIS.

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<sup>1</sup> USEPA. 2021. Technical Support Document for the Draft Fifth Contaminant Candidate List (CCL 5) - Chemical Contaminants. EPA 815-R-21-005. July 2021.

Appendix A provides CISs for 214 chemicals evaluated by the evaluation teams; and Appendix B provides the references for bracketed citations on the CISs. The remaining references for data sources on the CISs are included in Appendix N of the *Draft CCL 5 Chemical Technical Support Document* (USEPA, 2021).

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## Chapter 2 Overview of the Draft CCL 5 CISs

This chapter presents an overview of the CISs with a brief description of the data elements presented and how they were used in the CCL 5 process. The CIS for each chemical is a concise, four-page profile that was provided to the chemical evaluators to assist them in making listing recommendations for the Draft CCL 5.

The first page of each CIS includes a summary of the chemical's attribute scores, final hazard quotient, health effects and occurrence information used to calculate the final hazard quotient, chemical use information, and the chemical's status on the CCL. The second and third pages include detailed health effects and occurrence data, respectively. The derivation and use of these data are explained in detail in the *Draft CCL 5 Chemical Technical Support Document* (USEPA, 2021). The fourth page lists the references that are cited in the CISs.

### *Page 1 - Summary and Decision*

The first page of each chemical CIS contains six sections of information including contaminant identifiers and use characteristics, the Draft CCL 5 listing decision and final hazard quotient (fHQ), attribute scores, health effects and occurrence information, and the status of the contaminant with respect to nomination for the CCL 5 and decisions from previous CCL and regulatory determination cycles. From left to right, the six sections are described as follows:

- 1) **Contaminant Identification** – presents the contaminant name, a unique DSSTox Substance Identifier (DTXSID), the contaminant's Chemical Abstract Services Registry Number (CASRN), use information, and other notes. The DTXSID field also contains a hyperlink to the chemical's profile on EPA's CompTox Chemicals Dashboard. A second table indicates if the contaminant is on any health or occurrence-related lists (e.g., FIFRA and CERCLA lists).
- 2) **Contaminant Summary and Decision** – indicates whether the contaminant was listed on the Draft CCL 5 and presents the chemical's final hazard quotient (concentration in water divided by the health concentration).
- 3) **Contaminant Status** – indicates the status of the contaminant with respect to public nomination for the CCL 5, previous listing on CCLs 1-4, and previous negative regulatory determinations and the basis for that determination, if applicable.
- 4) **Attribute Scores** – presents assigned values/categories for each of the four CCL attributes derived from the health effects and occurrence data presented on the CISs, which are defined as follows:
  - a. **Potency** quantifies the potential for a chemical to cause adverse health effects based on the dose required to elicit the most sensitive adverse effect as identified

in a single study or assessment. Potency for chemicals is reflected in several standard toxicological parameters, including reference dose (RfD) or its equivalent, cancer slope factor (CSF) or its equivalent, no observed adverse effect level (NOAEL), or lowest observed adverse effect level (LOAEL).

- b. **Severity** is a descriptive measure of the adverse health effect associated with the toxicity value that is used as the measure of potency and corresponds with the type of adverse outcome expected to occur at the LOAEL of a chemical.
  - c. **Prevalence** provides a measure of how widespread the occurrence of the chemical is in the environment in the United States. The data used to develop the prevalence score may include the percent of PWSs or monitoring sites with detections of the contaminant, the number of states where pesticides are applied or releases to the environment are reported or chemicals are produced in pounds per year (lbs/year).
  - d. **Magnitude** refers to the quantity of a chemical that is or may be in the environment. This was measured using the median value concentration of detections (if available) in drinking water or ambient water or the total pounds of a chemical released to the environment. In cases where magnitude data are not available, persistence and mobility data (i.e., chemical property/environmental fate parameters) were used as surrogates for water occurrence or release data (see USEPA, 2021 for discussion). If a median was not available, the maximum was used.
- 5) **Health Effects Information** – presents the health effects information used to calculate the fHQ. If available, a health concentration (i.e., health reference level (HRL) or CCL Screening Level (CCL SL) was calculated from information provided by the cited assessment source. Health concentrations can be calculated for non-cancer and cancer endpoints and various target populations. The critical effect and target population from the selected assessment are also presented in this section.

Health concentrations are expressed as a concentration of a chemical in drinking water (expressed in  $\mu\text{g/L}$ ). To determine the health concentration for a chemical, the agency considered adverse health effects that may pose a greater risk to specific life stages and other sensitive groups which represent a meaningful portion of the population. Although an HRL or SL was calculated for every qualifying or non-qualifying data element presented on the health effects page, a single health concentration was chosen to calculate the fHQ that is presented on the Summary and Decision page. More details on this process is provided in Section 4.3.1 of the *Draft CCL 5 Chemical Technical Support Document* (USEPA, 2021). The assessment used as the source of the health concentration is the same assessment used as the source of the potency and severity attribute scores. This assessment is highlighted in yellow on the health effects page.

- 6) **Occurrence Information** – presents occurrence data used to calculate the fHQ - the 90<sup>th</sup> percentile concentration occurrence value, if available, or the next highest percentile value or the maximum concentration of detections (expressed in  $\mu\text{g/L}$ ). This section also indicates the data source, the type of water source monitored (e.g., finished or ambient water), and the monitoring date range. If measured data were unavailable, modeled



concentrations were used. A description of the selection process for the water concentration used to calculate the fHQ is provided in Section 4.3.2 and Appendix H of the *Draft CCL 5 Chemical Technical Support Document* (USEPA, 2021).

### *Page 2 - Health Effects Data*

The second page of the CISs presents the available health effects data for each chemical. The page is split into three distinct sections:

- 1. Qualifying and Non-Qualifying Health Effects Data** – presents data elements extracted from qualifying health assessments first followed by data elements extracted from non-qualifying health assessments. Differences between these two types of assessments are described in Section 4.3.1 of the *Draft CCL 5 Chemical Technical Support Document* (USEPA, 2021). The column headings indicate the data element, the numerical or qualitative value, associated units, and assessment source and year associated with the data element. Typically, the year is the date of publication of the data, although given the variability of the formatting of the data sources, it may represent a toxicological study date or the date when the data source website was last updated or accessed. If available, the critical study and effect are noted alongside the target population and exposure factor used to derive the HRL or CCL SL; a reference to the full citation is provided on page 4 of the CIS. A notes field is filled in if other pertinent information for a particular data element or a specific data source is available. The row for the data element used to develop the potency and severity attribute scores and to calculate the final hazard quotient is shaded yellow.
- 2. Literature Search Summary** – summarizes results from the rapid systematic review conducted for relevant health effects information, as further described in Section 4.2.2 of the *Draft CCL 5 Chemical Technical Support Document* (USEPA, 2021). Search start and end dates, based on the date of the most recent published health assessment for the chemical of interest, are listed. The number of unique references identified for each chemical and deemed relevant after title-abstract screening and full-text review is also provided. If available, lowest LOAEL and highest NOAEL health effects information from animal toxicity studies are presented with the corresponding study references. Additional supplementary materials and rapid systematic review results for each chemical are accessible via the CCL 5 docket (EPA-HQ-OW-2018-0594).
- 3. Other Health Data** – at the bottom of the health effects data page of the CIS are other supporting qualitative and quantitative data. These data represent measured and modeled health effects information collected from primary data sources and the CompTox Chemicals Dashboard. Examples include cancer classifications from non-EPA sources, toxicity or benchmark values for multiple exposure durations (e.g., acute) and routes (e.g., inhalation), and quantitative structure-activity relationship (QSAR) results. Data that have been modeled are provided in a separate table from the measured data.

### *Page 3 - Occurrence Data*

The third page of the CISs provides the available occurrence data for each chemical. Data used

to develop the occurrence attribute scores, also known as “scoring data,” are presented at the top of the page, followed by “non-scoring data”. Scoring data associated with a higher attribute score (i.e., higher prevalence or higher magnitude) is presented first. The page is split into six distinct sections:

- 1. Nationally Representative Water Data** – nationally representative finished water data represent the best estimation of the potential for human exposure; therefore, they are listed first in this section, followed by ambient water data. The column headers for the water data include the data source; number of total PWSs, sampling sites, or samples; number of positive results (referred to as “detects”); an indication as to whether these values correspond to PWSs, sampling sites, or samples; percent of PWSs, sites, or samples with detects; and where available, minimum, maximum, median, 90<sup>th</sup> percentile; units; sampling year(s); and a notes field. The row with the occurrence data element used to develop the prevalence and magnitude attribute scores is shaded yellow on the CIS.
- 2. Application, Release, and Production Data** – if water data were not available, then application, release, and production data were used to develop attribute scores to estimate the potential occurrence of chemicals in water. These include pesticide application data, toxic release data, and chemical production data, all measured in lbs/year, for the most recent year for which data were available at the time of CCL 5 data collection. In addition, the pesticide application and toxic release data provide counts for how many states a chemical was applied or released in the data collection year.
- 3. Non-Nationally Representative Water Data** – non-nationally representative water data are presented in the following order: finished water data, ambient water data, and waste water effluent data. These data were not used to develop attribute scores since they are not nationally representative; therefore, they are listed as “non-scoring data.” This section includes data from both primary and supplemental data sources. Similar to the Nationally Representative Water Data section, the data in this section includes column headers for the water occurrence data, including the data source; number of total PWSs, sampling sites, samples; number of detects, number of PWSs, sampling sites, or samples; percent of detects; and where available, minimum, maximum, median, 90<sup>th</sup> percentile; units; sampling year(s); and a notes field.
- 4. Estimated Concentration in Water** – estimated occurrence concentrations for pesticides that lacked nationally representative finished and/or nationally representative ambient water data. The data sources of presented modeled occurrence concentrations are EPA’s Office of Pesticide Programs (OPP) risk assessments. This section provides modelled concentrations, known as estimated environmental concentrations (EECs) or estimated drinking water concentrations (EDWCs), accompanied by information on the assessment source, publication date, model used, and any other relevant notes. A description of the estimated occurrence concentrations used in CCL 5 is provided in Section 4.2.1.2 of the *Draft CCL 5 Chemical Technical Support Document* (USEPA, 2021).
- 5. Predicted Exposure and Biomonitoring Data** – predicted exposure data from the EPA CompTox Dashboard provide results from qualitative structure-activity relationship

(QSAR) and ExpoCast models that have been developed to predict chemical identifications such as toxicity endpoints, physical properties, exposure and environmental fate parameters. This information is presented in addition to the biomonitoring data collected by CDC's National Health and Nutrition Examination Survey (NHANES), which provides data for detections at the 90<sup>th</sup> percentile in human tissues and fluids such as serum, blood, and urine. This information is included because the data suggest there is exposure in the U.S. population; there are serious known or suspected health effects associated with different levels of exposure; and there may be limited availability and adequacy of analytical methods, and other logistical and cost considerations that resulted in limited finished or ambient water data.

6. **Modelled Environmental Fate Parameters** – includes any available data on environmental fate parameters. These modelled parameters from the EPA CompToxDashboard provide measures of a chemical's persistence and mobility in the environment. These measures include half-life ( $t_{1/2}$ ), boiling point, vapor pressure, solubility in water, bioconcentration factor, Henry's Law constant ( $K_H$ ), and octanol-water partition coefficient ( $K_{ow}$ ).

#### *Page 4 - References*

The fourth page presents the references for the bracketed citations on the first three pages. References for all primary data sources are provided in Appendix N of the *Draft CCL 5 Chemical Technical Support Document* (USEPA, 2021).

## **Chapter 3 CIS Key**

The following four pages provide an annotated graphic illustration, known as the CIS Key, to assist with interpretation of the data on the CIS.

**Contaminant Identification:** Presents the contaminant name, DSSTox Substance ID (DTXSID) and Chemical Abstract Services Registry Number (CASRN), use, notes, and its status on health or occurrence related lists.

**Contaminant Summary and Decision:** Indicates the contaminant's status on the Draft CCL 5 and presents the final hazard quotient (concentration in water divided by the Health Reference Level (HRL) or CCL Screening Level (SL)).

**Contaminant Status:** Indicates if the contaminant was publicly nominated for CCL 5, its status on previous CCL cycles, and past negative regulatory determinations and the basis for that determination. If the contaminant does not have a negative regulatory determination, "Not Applicable" is recorded.

**1,4-Dioxane**  
CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

| CONTAMINANT IDENTIFYING INFORMATION               |                             |
|---------------------------------------------------|-----------------------------|
| Name:                                             | 1,4-Dioxane                 |
| CASRN:                                            | 123-91-1                    |
| DTXSID:                                           | DTXSID4020533               |
| Use:                                              | Solvent; solvent stabilizer |
| Chemical Notes:                                   |                             |
| Is the contaminant on any lists?                  |                             |
| CERCLA                                            | X                           |
| FIFRA                                             |                             |
| Human Neurotoxins                                 |                             |
| PubMed Neurotoxins                                |                             |
| Neurodev. Disruptors                              |                             |
| Androgen Receptors in vitro                       |                             |
| Compounds with neurodev effects, Mundy et al 2015 |                             |

| CONTAMINANT SUMMARY & DECISION                           |                                               |                                                   |                                      |                   |                      |
|----------------------------------------------------------|-----------------------------------------------|---------------------------------------------------|--------------------------------------|-------------------|----------------------|
| Draft CCL5 List Decision                                 |                                               |                                                   | Final Hazard Quotient (HQ)           |                   |                      |
| List                                                     |                                               |                                                   | 3.1                                  |                   |                      |
| ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION      |                                               |                                                   |                                      |                   |                      |
| Potency                                                  | Severity                                      |                                                   | Prevalence                           | Magnitude         |                      |
| 5                                                        | carcinogen with linear MOA                    |                                                   | 10                                   | 5                 |                      |
| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L)                        | Critical Effect                                   | Target Pop.                          | Assessment Source | Assessment Pub. Date |
| HRL                                                      | 0.3                                           | hepatocellular adenomas and carcinomas in females | general population                   | IRIS              | 2010                 |
| Conc. in water for HQ (ug/L)                             | 90th Percentile or Maximum (if measured conc) |                                                   | Finished or Ambient (FW, SW, GW, WW) | Source            | Date                 |
| 0.93                                                     | 90th Percentile                               |                                                   | Finished Water                       | UCMR3             | 2013 - 2015          |

| PUBLIC NOMINATION STATUS                      |                |                |       |
|-----------------------------------------------|----------------|----------------|-------|
| Public Nomination                             |                |                |       |
| X                                             |                |                |       |
| PAST CCL STATUS                               |                |                |       |
| CCL 1                                         | CCL 2          | CCL 3          | CCL 4 |
|                                               |                | X              | X     |
| PAST NEGATIVE REGULATORY DETERMINATION STATUS |                |                |       |
| RD 1                                          | RD 2           | RD 3           |       |
| Not Applicable                                | Not Applicable | Not Applicable |       |
| Basis                                         |                |                |       |
| Not Applicable                                |                |                |       |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level (SL). The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. The Source Contribution of 20%.

**Occurrence information:** Presents occurrence data used to calculate the final hazard quotient - the 90th percentile concentration occurrence value, if available, or the next highest percentile value or the maximum concentration of detections. If measured data were unavailable, modeled concentrations were used. Also, indicates water type, data source, and monitoring date(s).

Exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative

**Attribute Scores:** Presents assigned values/categories for each of the four CCL attributes derived from the health effects and occurrence data presented on the CISs. Attribute scores allow EPA to compare relative toxicity and occurrence of CCL 5 chemicals.

**Health Effects Information:** Presents data elements used to calculate the final hazard quotient, including the Health Reference Level (HRL) or CCL Screening Level (SL), the assessment from which the HRL or CCL SL was derived, and the corresponding critical effect and target population. The assessment listed here was also used as a source for the potency and severity attribute scores.

1,4-Dioxane  
CCL 5 Contaminant Information Sheet  
**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element                       | Value  | Units                     | Source     | Study                                   | Population                                                            | Exposure Factor (mg/kg-day) | Notes       |
|------------------------------------|--------|---------------------------|------------|-----------------------------------------|-----------------------------------------------------------------------|-----------------------------|-------------|
| Reference Dose (RfD) or Equivalent | 0.1    | mg/kg/day                 | ATSDR 2012 | Kociba et al. 1974                      | liver effects in male rats                                            | 33.8                        |             |
| Reference Dose (RfD) or Equivalent | 0.03   | mg/kg/day                 | IRIS 2010  | Kociba et al. 1974                      | liver and kidney toxicity                                             | 33.8                        | 178 [308]   |
| Reference Dose (RfD) or Equivalent | 0.096  | mg/kg/day                 | WHO 2005   | Kociba et al. 1974                      | renal tubular epithelial and hepatocellular degeneration and necrosis | 33.8                        | 568 [439]   |
| Reference Dose (RfD) or Equivalent | 0.0054 | mg/kg/day                 | HC 2018    | Kociba et al. 1974; Dourson et al. 2014 | hepatocellular necrosis                                               | 33.8                        | 32.0 [95]   |
| Cancer Slope Factor (CSF)          | 0.1    | (mg/kg/day) <sup>-1</sup> | IRIS 2010  | Kano et al. 2009                        | hepatocellular adenomas and carcinomas in female mice                 | 33.8                        | 0.296 [308] |
| Cancer Classification (CC)         | L      |                           | IRIS 2010  |                                         |                                                                       |                             | [308]       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect |
|--------------|-------|-------|-------------------|----------------|-----------------|
|--------------|-------|-------|-------------------|----------------|-----------------|

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|
| Hepatic, Systemic           | 440                         | GI, 2018           | Hepatic                      | 562                          | GI, 2018            |

**Other Health Data**

| Data Element                                      | Value     | Units                              | Source                                | Notes |
|---------------------------------------------------|-----------|------------------------------------|---------------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |           |                                    |                                       |       |
| 10-day Health Advisory                            | 0.4       | mg/L                               | EPA DWSHA 2018                        |       |
| Acute inhalation Minimal Risk Level (MRL)         | 2         | ppm                                | CDC ATSDR                             |       |
| Benchmark                                         | 0.001     | mg/L                               | CalEPA OEHHA Chemical Database        |       |
| Cancer Slope Factor (CSF)                         | 0.027     | (mg/kg/day) <sup>-1</sup>          | CalEPA OEHHA Chemical Database        |       |
| Chronic Health-Based Guidance Value               | 0.1       | mg/L                               | MN DOH                                |       |
| Chronic Health-Based Guidance Value               | 0.0001    | mg/L                               | MN DOH                                |       |
| Chronic inhalation Minimal Risk Level (MRL)       | 0.03      | ppm                                | CDC ATSDR                             |       |
| Drinking Water Guideline Value                    | 0.05      | mg/L                               | WHO Drinking Water Quality Guidelines |       |
| Inhalation Unit Risk (IUR)                        | 0.000005  | (ug/m <sup>3</sup> ) <sup>-1</sup> | EPA IRIS                              |       |
| Inhalation Unit Risk (IUR)                        | 0.0000077 | ug/m <sup>3</sup>                  | CalEPA OEHHA Chemical Database        |       |
| Intermediate Inhalation Minimal Risk Level (MRL)  | 0.2       | ppm                                | CDC ATSDR                             |       |
| Intermediate Minimal Risk Level (MRL)             | 0.5       | mg/kg/day                          | CDC ATSDR                             |       |
| Lifetime Health Advisory                          | 0.2       | mg/L                               | EPA DWSHA 2018                        |       |
| Lifetime Health Advisory                          | 0.00035   | mg/L                               | EPA DWSHA 2018                        |       |
| Reference Concentration (RfC)                     | 0.03      | mg/m <sup>3</sup>                  | EPA IRIS                              |       |
| Reference Concentration (RfC)                     | 3000      | ug/m <sup>3</sup>                  | CalEPA OEHHA Chemical Database        |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.3       | mg/L                               | MN DOH                                |       |
| Cancer Classification (CC)                        |           |                                    |                                       |       |
| Cancer Classification (CC)                        |           |                                    |                                       |       |
| Cancer Classification (CC)                        |           |                                    |                                       |       |
| Cancer Classification (CC)                        |           |                                    |                                       |       |
| Cancer Classification (CC)                        |           |                                    |                                       |       |

Notes: Highlighted cells indicate values were not available. Blank fields indicate values were not available. The full citation for the critical study is provided in the references section. PECO = Population, Exposure, Critical Effect, Outcome.

**Qualifying and Non-Qualifying Health Effects Data:** Presents data elements from qualifying health assessments first, followed by those from non-qualifying health assessments. The column headings summarize the data element, the numerical value (or qualitative, for cancer classifications), units and assessment source and year associated with the data element. If available, the critical study and effect are noted along with the target population, exposure factor, HRL or CCL SL, and a reference to the full citation on the references page. A notes field is filled in if other pertinent information for a particular data element is available.

**Yellow shading** indicates the data used to populate the potency and severity attribute scores, health effects information, and final hazard quotient sections on the Summary + Decision page.

**Literature Search Summary:** Summarizes the rapid systematic review results for relevant health effects information. If available, the lowest LOAEL and highest NOAEL health effects information from animal toxicology studies are presented with references. Search date ranges based on the publication date of the most recent health assessment are listed. The numbers of unique references identified and deemed relevant after title-abstract screen and full-text review are also provided.

|                              |       |           |                         |     |
|------------------------------|-------|-----------|-------------------------|-----|
| LD50                         | 2000  | mg/kg     | NIH HSDB                | min |
| LD50                         | 5700  | mg/kg     | NIH HSDB                | max |
| Percent of active toxcast in | 0.85  | percent   | EPA Chemistry Dashboard |     |
| TD50                         | 40.5  | mg/kg/day | NIH CPDB                | min |
| TD50                         | 71900 | mg/kg/day | NIH CPDB                | max |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0335738 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.069     | no units | TEST QSAR |       |
| Developmental toxin test | 0.408     | no units | TEST QSAR |       |

**Other Health Data:** Presents supporting qualitative and quantitative health effects data. These data represent measured and modeled health effects information collected from primary data sources and the CompTox Chemicals Dashboard. Modeled data is provided in a separate table from measured data.

1,4-Dioxane  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATAScoring Data  
Nationally Representative Water Data

## Finished Water

|                                                              |             |       |       |       |    |      |      |      |    |      |  |  |
|--------------------------------------------------------------|-------------|-------|-------|-------|----|------|------|------|----|------|--|--|
| Unregulated Contaminant Monitoring Rule (UCMR) 4             | 2018 - 2019 |       |       |       |    |      |      |      |    |      |  |  |
| Unregulated Contaminant Monitoring Rule (UCMR) 3             | 2013 - 2015 | 4,915 | 1,077 | Sites | 22 | 0.07 | 0.17 | 0.93 | 34 | ug/L |  |  |
| Unregulated Contaminant Monitoring Rule (UCMR) 2             | 2008 - 2010 |       |       |       |    |      |      |      |    |      |  |  |
| Unregulated Contaminant Monitoring Rule (UCMR) 1             | 2001 - 2003 |       |       |       |    |      |      |      |    |      |  |  |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2 | 1993 - 1997 |       |       |       |    |      |      |      |    |      |  |  |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1 | 1988 - 1992 |       |       |       |    |      |      |      |    |      |  |  |
| National Inorganics and Radionuclides Survey (NIRS)          | 1984 - 1986 |       |       |       |    |      |      |      |    |      |  |  |

## Ambient Water

|                                                                |  |  |  |  |  |      |       |      |      |  |  |  |
|----------------------------------------------------------------|--|--|--|--|--|------|-------|------|------|--|--|--|
| National Water Quality Assessment (USGS NAWQA) (All Water)     |  |  |  |  |  | 0.57 | 0.568 | 1.83 | 16.0 |  |  |  |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) |  |  |  |  |  | 9.8  | 0.568 | 2.06 | 17.0 |  |  |  |
| National Water Quality Assessment (USGS NAWQA) (Groundwater)   |  |  |  |  |  | 0.22 | 0.9   | 1.83 | 3.0  |  |  |  |

| Pesticide Application Data                         | Number of States |
|----------------------------------------------------|------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |

## Non-Scoring Data

## Non-Nationally Representative Water Data

## Finished Water

|                                                       |             |    |    |       |    |        |     |      |     |      |  |  |
|-------------------------------------------------------|-------------|----|----|-------|----|--------|-----|------|-----|------|--|--|
| Drinking Water Monitoring Data - CA (Finished)        | 2006 - 2020 | 42 | 18 | Sites | 43 | 0.5    | 1.5 | 3.2  | 9.1 | ug/L |  |  |
| Drinking Water Monitoring Data - MA (Finished)        | 2006 - 2020 | 10 | 8  | Sites | 80 | 0.0081 | 0.2 | 0.51 | 1.1 | ug/L |  |  |
| Community Water System Survey (CWSS) (Finished) [178] | 2006        | 1  | NA | Sites |    |        | 0.8 | 1.4  |     | ug/L |  |  |

## Ambient Water

|                                                               |             |     |    |       |    |        |       |      |      |      |  |  |
|---------------------------------------------------------------|-------------|-----|----|-------|----|--------|-------|------|------|------|--|--|
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 274 | 67 | Sites | 24 | 0.27   | 2     | 5.9  | 36   | ug/L |  |  |
| Drinking Water Monitoring Data - MA (Source)                  | 2006 - 2020 | 6   | 5  | Sites | 83 | 0.0272 | 0.24  | 1.3  | 3.5  | ug/L |  |  |
| National Water Information System (USGS NWIS) (Surface Water) |             |     |    |       |    | 0.124  | 1.32  | 6.94 | 15.9 | ug/L |  |  |
| National Water Information System (USGS NWIS) (Groundwater)   |             |     |    |       |    | 0.083  | 3.3   | 7.6  | 36   | ug/L |  |  |
| National Water Information System (USGS NWIS) (All Water)     |             |     |    |       |    | 0.083  | 3.2   | 7.6  | 36   | ug/L |  |  |
| Community Water System Survey (CWSS) (Source)                 |             |     |    |       |    |        | 0.9   | 1.3  |      | ug/L |  |  |
| Bradley et al. 2017 (Ambient) [52]                            |             |     |    |       |    | 0.7226 | 0.987 | 2.7  |      |      |  |  |
| Arnold et al. 2016 (Unfiltered) [7]                           |             |     |    |       |    | 1      | 1.5   | 1.9  |      |      |  |  |

## Waste Water Effluent

## Estimated Concentration in Water

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| ExpoCast exposure                                  |      | 0.0000011                               |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted cells indicate value. Blank fields indicate there were no data. "All Water" data from NWIS and NAWQA. Monitoring dates for non-scoring data are State Drinking Water Monitoring Rule (SDMR) UCMR 4 data used in the draft CCL 5.

**Nationally Representative Water Data:** Scoring data presented in order of the hierarchical attribute scoring protocol established for prevalence and magnitude. Finished water data from the most recent UCMR cycle are shown first, followed by the preceding UCMR cycles, then UCM and finally NIRS. Lastly, national ambient water data from NAWQA.

**Yellow shading** indicates the data used to calculate the prevalence and magnitude attribute scores on the Summary + Decision Page.

**Non-Nationally Representative Water Data:** Non-scoring data from primary and supplemental sources that are presented in order of hierarchy, separated into three categories: finished water data, ambient water data, and waste water effluent data.

**Estimated Concentration in Water:** Pesticide modelled concentrations used in instances when no finished or ambient water data were available. The modelled value and units are included in this section, accompanied by information on the source, publication date, model used, and relevant notes.

**Application, Release, and Production Data:** Additional scoring data for Prevalence and Magnitude used to estimate potential occurrence in water in the absence of measured water data. They include application rate data for pesticides, toxic release data, and chemical production data.

**Modelled Environmental Fate Parameters:** Available environmental fate parameters for a chemical extracted from EPA's CompTox Dashboard. For persistence, this includes the chemical's half-life. The remaining properties relate to a chemical's mobility in the environment.

**Predicted Exposure and Biomonitoring Data:** Predicted daily exposure (ExpoCast) data extracted from EPA's CompTox Dashboard are presented above biomonitoring data from the National Health and Nutrition Examination Survey (NHANES) Biospecimen Program. Biomonitoring values presented are the 90th percentile concentrations of compounds in serum, blood and/or urine.

**1,4-Dioxane**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 30               | ATSDR. 2012. Toxicological Profile for 1,4-Dioxane. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                                                                                                                                                                    |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. Environmental science & technology, 51(9), 4792-4802.                                                                                                                                               |
| 95               | HC. 2018. Guideline Technical Document for Public Consultation, 1,4-Dioxane in Drinking Water. Health Canada (HC), Ottawa, Ontario, Canada.                                                                                                                                                                                                                                                                                        |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                                                                                                                                                              |
| 308              | USEPA. 2010. Chemical Assessment Summary, 1,4-Dioxane. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, D.C.                                                                                                                                                                                                                             |
| 439              | WHO. 2005. 1,4-Dioxane in Drinking-water. WHO Guidelines for Drinking-water Quality. World Health Organization (WHO), Geneva, Switzerland.                                                                                                                                                                                                                                                                                         |



**References:** This page presents the full references for the bracketed citations on the CISs.



## Appendix A Contaminant Information Sheets

This appendix contains CISs for the 214 chemicals reviewed by the evaluation teams for the Draft CCL 5. These chemicals are listed in alphabetic order in a table, followed by 859 pages of CISs in a tabular format containing background, health effects, and occurrence information. Due to the technical limitations of this section, for further assistance with reasonable accommodation please contact Brynne Storsved at [storsved.brynne@epa.gov](mailto:storsved.brynne@epa.gov) or 202-564-4004.

| Chemical Name                                     | DTXSID        |
|---------------------------------------------------|---------------|
| 1,1,2,2-Tetrachloroethane                         | DTXSID7021318 |
| 1,2,3-Trichloropropane                            | DTXSID9021390 |
| 1,3-Butadiene                                     | DTXSID3020203 |
| 1,3-Dichloropropene                               | DTXSID1022057 |
| 1,4-Dioxane                                       | DTXSID4020533 |
| 17-alpha-ethynyl estradiol                        | DTXSID5020576 |
| 17-beta estradiol                                 | DTXSID0020573 |
| 1-Butanol                                         | DTXSID1021740 |
| 1H-Benzotriazole, 4(or 5)-methyl-                 | DTXSID0026171 |
| 2-(2-Methyl-4-chlorophenoxy)propionic acid (MCPP) | DTXSID9024194 |
| 2,4-Dichlorophenol                                | DTXSID1020439 |
| 2,4-Dichlorophenoxybutyric acid                   | DTXSID7024035 |
| 2,4-Dinitrophenol                                 | DTXSID0020523 |
| 2,4-Dinitrotoluene                                | DTXSID0020529 |
| 2,6-Dinitrotoluene                                | DTXSID5020528 |
| 2-Aminotoluene                                    | DTXSID1026164 |
| 2-Hydroxyatrazine                                 | DTXSID6037807 |
| 2-Methyl-4-chlorophenoxyacetic acid (MCPA)        | DTXSID4024195 |
| 2-Methylnaphthalene                               | DTXSID4020878 |
| 4-Androstene-3,17-dione                           | DTXSID8024523 |
| 4-Nonylphenol (all isomers)                       | DTXSID3021857 |
| 4-tert-Octylphenol                                | DTXSID9022360 |
| 6-Chloro-1,3,5-triazine-2,4-diamine               | DTXSID1037806 |
| Acephate                                          | DTXSID8023846 |
| Acetamiprid                                       | DTXSID0034300 |
| Acetochlor ethanesulfonic acid                    | DTXSID6037483 |
| Acetochlor oxanilic acid (OA)                     | DTXSID1037484 |
| Acetophenone                                      | DTXSID6021828 |
| Acrolein                                          | DTXSID5020023 |
| Acyclovir                                         | DTXSID1022556 |

| <b>Chemical Name</b>                    | <b>DTXSID</b> |
|-----------------------------------------|---------------|
| Alachlor ethanesulfonic acid (ESA)      | DTXSID6037485 |
| Alachlor OA                             | DTXSID1037486 |
| Aldrin                                  | DTXSID8020040 |
| alpha-Hexachlorocyclohexane (alpha-HCH) | DTXSID2020684 |
| Ametryn                                 | DTXSID1023869 |
| Ammonia                                 | DTXSID0023872 |
| Anthraquinone                           | DTXSID3020095 |
| Atenolol                                | DTXSID2022628 |
| Azoxystrobin                            | DTXSID0032520 |
| Benfluralin                             | DTXSID3023899 |
| Bensulide                               | DTXSID9032329 |
| Bentazon                                | DTXSID0023901 |
| Benzophenone                            | DTXSID0021961 |
| Bifenthrin                              | DTXSID9020160 |
| Bisphenol A                             | DTXSID7020182 |
| Boron                                   | DTXSID3023922 |
| Boscalid                                | DTXSID6034392 |
| Bromacil                                | DTXSID4022020 |
| Bromochloromethane                      | DTXSID4021503 |
| Bromoxynil                              | DTXSID3022162 |
| Bupropion                               | DTXSID7022706 |
| Butyl benzyl phthalate                  | DTXSID3020205 |
| Caffeine                                | DTXSID0020232 |
| Calcium                                 | DTXSID9050484 |
| Camphor                                 | DTXSID5030955 |
| Carbamazepine                           | DTXSID4022731 |
| Carbaryl                                | DTXSID9020247 |
| Carbendazim (MBC)                       | DTXSID4024729 |
| Carbon disulfide                        | DTXSID6023947 |
| Chlordecone (Kepone)                    | DTXSID1020770 |
| Chlorodifluoromethane (HCFC-22)         | DTXSID6020301 |
| Chloromethane                           | DTXSID0021541 |
| Chlorothalonil                          | DTXSID0020319 |
| Chlorpyrifos                            | DTXSID4020458 |
| Clomazone                               | DTXSID1032355 |
| Clopyralid                              | DTXSID9029221 |
| Clothianidin                            | DTXSID2034465 |

| <b>Chemical Name</b>                       | <b>DTXSID</b>  |
|--------------------------------------------|----------------|
| Cobalt                                     | DTXSID1031040  |
| Cotinine                                   | DTXSID1047576  |
| Cycloate                                   | DTXSID6032356  |
| Cyfluthrin                                 | DTXSID5035957  |
| Cyhalothrin                                | DTXSID6023997  |
| Cypermethrin                               | DTXSID1023998  |
| Cyprodinil                                 | DTXSID1032359  |
| Deethylatrazine                            | DTXSID5037494  |
| Desisopropyl atrazine                      | DTXSID0037495  |
| Desvenlafaxine                             | DTXSID40869118 |
| Diazepam                                   | DTXSID4020406  |
| Diazinon                                   | DTXSID9020407  |
| Dicamba                                    | DTXSID4024018  |
| Dichlorvos                                 | DTXSID5020449  |
| Dicrotophos                                | DTXSID9023914  |
| Dieldrin                                   | DTXSID9020453  |
| Diethyl phthalate                          | DTXSID7021780  |
| Difenoconazole                             | DTXSID4032372  |
| Dimethenamid                               | DTXSID4032376  |
| Dimethenamid oxanilic acid degradate (OXA) | DTXSID4037530  |
| Dimethoate                                 | DTXSID7020479  |
| Di-n-butyl phthalate                       | DTXSID2021781  |
| Diuron                                     | DTXSID0020446  |
| Esfenvalerate                              | DTXSID4032667  |
| Ethalfuralin                               | DTXSID8032386  |
| Ethion                                     | DTXSID2024086  |
| Ethoprop                                   | DTXSID4032611  |
| Ethyl dipropylthiocarbamate (EPTC)         | DTXSID1024091  |
| Famoxadone                                 | DTXSID8034588  |
| Fenbuconazole                              | DTXSID8032548  |
| Fenitrothion                               | DTXSID4032613  |
| Fenpropathrin                              | DTXSID0024002  |
| Fenthion                                   | DTXSID8020620  |
| Fexofenadine                               | DTXSID00861411 |
| Fipronil                                   | DTXSID4034609  |
| Fluconazole                                | DTXSID3020627  |
| Flufenacet                                 | DTXSID2032552  |

| <b>Chemical Name</b>           | <b>DTXSID</b> |
|--------------------------------|---------------|
| Fluometuron                    | DTXSID8020628 |
| Fluoranthene                   | DTXSID3024104 |
| Fluoxetine                     | DTXSID7023067 |
| Galaxolide                     | DTXSID8027373 |
| Gemfibrozil                    | DTXSID0020652 |
| Heroin                         | DTXSID6046761 |
| Hexazinone                     | DTXSID4024145 |
| Imazalil                       | DTXSID8024151 |
| Imazapyr                       | DTXSID8034665 |
| Imazaquin                      | DTXSID3024152 |
| Imazethapyr                    | DTXSID3024287 |
| Imidacloprid                   | DTXSID5032442 |
| Indoxacarb                     | DTXSID1032690 |
| Iprodione                      | DTXSID3024154 |
| Isophorone                     | DTXSID8020759 |
| Isopropylbenzene (Cumene)      | DTXSID1021827 |
| Isoxaflutole                   | DTXSID5034723 |
| Lactofen                       | DTXSID7024160 |
| lambda-Cyhalothrin             | DTXSID7032559 |
| Lidocaine                      | DTXSID1045166 |
| Linuron                        | DTXSID2024163 |
| Lithium                        | DTXSID5036761 |
| Loratadine                     | DTXSID2023224 |
| Magnesium                      | DTXSID0049658 |
| Malathion                      | DTXSID4020791 |
| Manganese                      | DTXSID2024169 |
| Meprobamate                    | DTXSID3023261 |
| Metalaxyl                      | DTXSID6024175 |
| Metformin                      | DTXSID2023270 |
| Methocarbamol                  | DTXSID6023286 |
| Methomyl                       | DTXSID1022267 |
| Methyl tert-butyl ether (MTBE) | DTXSID3020833 |
| Methylmercury                  | DTXSID9024198 |
| Metolachlor ESA                | DTXSID1037567 |
| Metolachlor OA                 | DTXSID6037568 |
| Metoprolol                     | DTXSID2023309 |
| Metribuzin                     | DTXSID6024204 |

| <b>Chemical Name</b>           | <b>DTXSID</b>  |
|--------------------------------|----------------|
| Molybdenum                     | DTXSID1024207  |
| Morphine                       | DTXSID9023336  |
| Morphine-3-glucuronide         | DTXSID80174157 |
| Myclobutanil                   | DTXSID8024315  |
| N,N-Diethyl-m-toluamide (DEET) | DTXSID2021995  |
| Naled                          | DTXSID1024209  |
| Naphthalene                    | DTXSID8020913  |
| Nicotine                       | DTXSID1020930  |
| Norflurazon                    | DTXSID8024234  |
| Oxadiazon                      | DTXSID3024239  |
| Oxyfluorfen                    | DTXSID7024241  |
| p,p'-DDE                       | DTXSID9020374  |
| p-Cresol                       | DTXSID7021869  |
| Pendimethalin                  | DTXSID7024245  |
| Permethrin                     | DTXSID8022292  |
| Phenanthrene                   | DTXSID6024254  |
| Phenol                         | DTXSID5021124  |
| Phorate                        | DTXSID4032459  |
| Phosmet                        | DTXSID5024261  |
| Phosphorus                     | DTXSID1024382  |
| Phostebupirim                  | DTXSID1032482  |
| Piperonyl butoxide             | DTXSID1021166  |
| Potassium                      | DTXSID9049748  |
| Profenofos                     | DTXSID3032464  |
| Prometon                       | DTXSID6022341  |
| Prometryn                      | DTXSID4024272  |
| Pronamide                      | DTXSID2020420  |
| Propachlor                     | DTXSID4024274  |
| Propanil                       | DTXSID8022111  |
| Propargite                     | DTXSID4024276  |
| Propazine                      | DTXSID3021196  |
| Propiconazole                  | DTXSID8024280  |
| Propoxur                       | DTXSID7021948  |
| Prosulfuron                    | DTXSID9034868  |
| Pymetrozine                    | DTXSID2032637  |
| Pyraclostrobin                 | DTXSID7032638  |
| Pyrene                         | DTXSID3024289  |

| <b>Chemical Name</b>                         | <b>DTXSID</b>  |
|----------------------------------------------|----------------|
| Pyridaben                                    | DTXSID5032573  |
| Quinoline                                    | DTXSID1021798  |
| Silicon                                      | DTXSID0051441  |
| Sitagliptin                                  | DTXSID70197572 |
| Sodium                                       | DTXSID1049774  |
| Sulfamethoxazole                             | DTXSID8026064  |
| Sulfentrazone                                | DTXSID6032645  |
| Sulfomethuron-methyl                         | DTXSID0034936  |
| Tamoxifen                                    | DTXSID1034187  |
| Tebuconazole                                 | DTXSID9032113  |
| Tebuthiuron                                  | DTXSID3024316  |
| Tefluthrin                                   | DTXSID5032577  |
| Terbacil                                     | DTXSID8024317  |
| Terbufos                                     | DTXSID2022254  |
| Testosterone                                 | DTXSID8022371  |
| Tetraconazole                                | DTXSID8034956  |
| Thiabendazole                                | DTXSID0021337  |
| Thiamethoxam                                 | DTXSID2034962  |
| Thiobencarb                                  | DTXSID6024337  |
| Thiram                                       | DTXSID5021332  |
| Tin                                          | DTXSID1049801  |
| Tri-allate                                   | DTXSID5024344  |
| Tribufos                                     | DTXSID1024174  |
| Tributyl phosphate                           | DTXSID3021986  |
| Triclopyr                                    | DTXSID0032497  |
| Triclosan                                    | DTXSID5032498  |
| Triethyl citrate                             | DTXSID0040701  |
| Trifloxystrobin                              | DTXSID4032580  |
| Trifluralin                                  | DTXSID4021395  |
| Trimethylbenzene (1,2,4-)                    | DTXSID6021402  |
| Tris(1,3-dichloro-2-propyl) phosphate (TDCP) | DTXSID9026261  |
| Tris(2-butoxyethyl) phosphate (TBEP)         | DTXSID5021758  |
| Tris(2-chloroethyl) phosphate (TCEP)         | DTXSID5021411  |
| Tungsten                                     | DTXSID8052481  |
| Vanadium                                     | DTXSID2040282  |
| Verapamil                                    | DTXSID9041152  |

**1,1,2,2-Tetrachloroethane**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                                                                                                                                |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name:           | 1,1,2,2-Tetrachloroethane                                                                                                                                                      |
| CASRN:          | 79-34-5                                                                                                                                                                        |
| DTXSID:         | <a href="#">DTXSID7021318</a>                                                                                                                                                  |
| Use:            | Industrial solvent; former pesticide; in manufacture of paints, varnish, rust removers; in soil sterilization and weed killer, insecticide formulations; chemical intermediate |
| Chemical Notes: |                                                                                                                                                                                |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 27                         |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 5       | carcinogen with linear MOA | 5          | 6         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect           | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.1                    | hepatocellular carcinomas | general population | IRIS              | 2010                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 2.684                        | 90th Percentile                               | Finished Water                       | UCM1   | 1988-1992 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2 | RD 3           |
|----------------|------|----------------|
| Not Applicable | X    | Not Applicable |
| Basis          |      |                |

1,1,2,2-tetrachloroethane is not expected to occur in many PWSs today. While 1,1,2,2-tetrachloroethane was detected in both the UCM Round 1 and the UCM Round 2 surveys, the percentage of detections had decreased by the time the UCM Round 2 survey was performed in the mid-1990's [a]. In addition, USGS did not detect 1,1,2,2-tetrachloroethane in two subsequent monitoring surveys of source waters that supply community water systems, using a reporting limit that is less than the 1,1,2,2-tetrachloroethane HRL of 0.4 ug/L [b,c]. EPA believes that this decrease in detections occurred because commercial production of 1,1,2,2-tetrachloroethane ceased in the mid-1980's [d].

[a] USEPA, 2008 [297]; [b] Grady, 2003 [87]; [c] Delzer & Ivahnenko, 2003 [68]; [d] ATSDR, 1996 [4]; as cited in USEPA, 2008 [296]

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**1,1,2,2-Tetrachloroethane**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value   | Units                     | Assessment Source | Critical Study      | Critical Effect                                                  | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|---------|---------------------------|-------------------|---------------------|------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0011  | mg/kg/day                 | CALEPA 2003       | Schmidt et al. 1972 | transient weight gain depression and increased liver fat content | general population | 33.8                        | 6.51       | [57]                     |       |
| Reference Dose (RfD) or Equivalent | 0.0107  | mg/kg/day                 | OW 2008           | NTP 2004            | increase in relative liver weight                                | general population | 33.8                        | 63.3       | [287]                    |       |
| Reference Dose (RfD) or Equivalent | 0.01071 | mg/kg/day                 | OW 2008           | NTP 2004            | increase in relative liver weight                                | general population | 33.8                        | 63.4       | [291]                    |       |
| Reference Dose (RfD) or Equivalent | 0.02    | mg/kg/day                 | IRIS 2010         | NTP 2004            | increased relative liver weights                                 | general population | 33.8                        | 118        | [307]                    |       |
| Cancer Slope Factor (CSF)          | 0.15    | (mg/kg/day) <sup>-1</sup> | CALEPA 2003       | NCI 1978            | hepatocellular carcinoma                                         | general population | 33.8                        | 0.197      | [57]                     |       |
| Cancer Slope Factor (CSF)          | 0.085   | (mg/kg/day) <sup>-1</sup> | OW 2008           | NCI 1978            | hepatocellular carcinomas                                        | general population | 33.8                        | 0.348      | [287]                    |       |
| Cancer Slope Factor (CSF)          | 0.085   | (mg/kg/day) <sup>-1</sup> | OW 2008           | NCI 1978            | hepatocellular carcinomas                                        | general population | 33.8                        | 0.348      | [291]                    |       |
| Cancer Slope Factor (CSF)          | 0.2     | (mg/kg/day) <sup>-1</sup> | IRIS 2010         | NCI 1978            | hepatocellular carcinomas                                        | general population | 33.8                        | 0.148      | [307]                    |       |
| Cancer Classification (CC)         | L       |                           | OW 2008           |                     |                                                                  |                    |                             |            | [287]                    |       |
| Cancer Classification (CC)         | L       |                           | OW 2008           |                     |                                                                  |                    |                             |            | [291]                    |       |
| Cancer Classification (CC)         | L       |                           | IRIS 2010         |                     |                                                                  |                    |                             |            | [307]                    |       |
|                                    |         |                           | ATSDR 2008        |                     |                                                                  |                    |                             |            | [27]                     |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     | 2009-09-01           | 2020-04-07         | 45                                             | 0                                               | 1                                              |                                                   |

**Other Health Data**

| Data Element                                | Value         | Units                     | Source                            | Notes |
|---------------------------------------------|---------------|---------------------------|-----------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |               |                           |                                   |       |
| 10-day Health Advisory                      | 3             | mg/L                      | EPA DWSHA 2018                    |       |
| Cancer Slope Factor (CSF)                   | 0.2           | (mg/kg/day) <sup>-1</sup> | CalEPA OEHHA Chemical Database    |       |
| Chronic Health-Based Guidance Value         | 0.0002        | mg/L                      | MN DOH                            |       |
| Human Health Ambient Water Quality Criteria | 0.0002        | mg/L                      | EPA Human Health Criteria for CWA |       |
| Inhalation Unit Risk (IUR)                  | 0.000058      | ug/m <sup>3</sup>         | CalEPA OEHHA Chemical Database    |       |
| Intermediate Minimal Risk Level (MRL)       | 0.5           | mg/kg/day                 | CDC ATSDR                         |       |
| Lifetime Health Advisory                    | 0.0004        | mg/L                      | EPA DWSHA 2018                    |       |
| Public Health Goal                          | 0.0001        | mg/L                      | CalEPA OEHHA Public Health Goals  |       |
| Cancer Classification (CC)                  | 2B            | no units                  | WHO IARC                          |       |
| Cancer Classification (CC)                  | Female.Mice P | no units                  | HHS NTP                           |       |
| Cancer Classification (CC)                  | Female.Rats N | no units                  | HHS NTP                           |       |
| Cancer Classification (CC)                  | Male.Mice P   | no units                  | HHS NTP                           |       |
| Cancer Classification (CC)                  | Male.Rats E   | no units                  | HHS NTP                           |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                  | Notes |
|--------------------------------------------------|-------|-----------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                         |       |
| LD50                                             | 250   | mg/kg     | NIH HSDB                |       |
| Percent of active toxcast in vitro assays tested | 2.55  | percent   | EPA Chemistry Dashboard |       |
| TD50                                             | 1910  | mg/kg/day | NIH CPDB                | max   |
| TD50                                             | 35.4  | mg/kg/day | NIH CPDB                | min   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0108893 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.148     | no units | TEST QSAR |       |
| Developmental toxin test | 0.374     | no units | TEST QSAR |       |



Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

1,1,2,2-Tetrachloroethane

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

OCCURRENCE DATA

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 | 24,800                        | 19                | Sites              | 0.08                 | 0.1                     | 0.5                    | 1.5                       | 2                       | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 | 20,407                        | 91                | Sites              | 0.45                 | 0.05                    | 0.5                    | 2.68                      | 200                     | ug/L        |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 6,771                         | 4                 | Sites              | 0.06                 | 0.02                    | 0.08                   | 0.29                      | 0.38                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 225                           | 2                 | Sites              | 0.89                 | 0.02                    | 0.08                   | 0.164                     | 0.2                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 6,546                         | 2                 | Sites              | 0.03                 | 0.06                    | 0.22                   | 0.316                     | 0.38                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) | 9                | 5,936                      | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 466                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - MA (Finished)                | 2006 - 2020 | 885                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WA (Finished)                | 2006 - 2011 | 1,098                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 4,714                         | 4                 | Sites               | 0.08                 | 0.8                     | 1.2                    | 3.36                      | 4.28                    | ug/L        |       |
| Drinking Water Monitoring Data - FL (Source)                  | 2006 - 2011 | 3                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - MA (Source)                  | 2006 - 2020 | 130                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - PA (Source)                  | 2006 - 2011 | 13                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WA (Source)                  | 2006 - 2011 | 1,521                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WI (Source)                  | 2012-2019   | 112                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 237                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 2,806                         | 2                 | Sites               | 0.07                 | 2.1                     | 4                      | 13.8                      | 18                      | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 3,039                         | 2                 | Sites               | 0.07                 | 2.1                     | 4                      | 13.8                      | 18                      | ug/L        |       |
| Arnold et al. 2016 (Unfiltered) [7]                           | 2012 - 2013 | 158                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                       | Date        | Source                        | Value             | Units               | Model                |                         |                        |                           |                         | Notes       |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.0000368                               |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) | < LOD                        | ng/ml |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 14.5265     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 147.582     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 132.363     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 7.28977     | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 5.3827      | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0176084   | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0107647   | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 11.7866     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 15.5239     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000500707 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.35016     | no units                |       |

**1,1,2,2-Tetrachloroethane**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4                | Agency for Toxic Substances and Disease Registry (ATSDR). 1996. Toxicological Profile for 1,1,2,2-Tetrachloroethane. Atlanta, GA: Agency for Toxic Substances and Disease Registry, Public Health Service U.S. Department of Health and Human Services. Available on the Internet at: <a href="http://www.atsdr.cdc.gov/toxprofiles/tp93.html">http://www.atsdr.cdc.gov/toxprofiles/tp93.html</a> .                                                            |
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> .                             |
| 27               | ATSDR. 2008. Toxicological Profile for 1,1,2,2-Tetrachloroethane. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                                                                                                                                                                                  |
| 57               | CalEPA. 2003. Public Health Goal for 1,1,2,2-Tetrachloroethane in Drinking Water. California Environmental Protection Agency (CalEPA), Office of Environmental Health Hazard Assessment, Sacramento, CA.                                                                                                                                                                                                                                                       |
| 68               | Delzer, G.C. and T. Ivahnenko. 2003. Occurrence and Temporal Variability of Methyl tertButyl Ether (MTBE) and Other Volatile Organic Compounds in Select Sources of Drinking Water: Results of the Focused Survey. U.S. Geological Survey WaterResources Investigations Report 02-4084. 65 pp. Available on the Internet at: <a href="http://sd.water.usgs.gov/nawqa/pubs/wrir/wrir02_4084.pdf">http://sd.water.usgs.gov/nawqa/pubs/wrir/wrir02_4084.pdf</a> . |
| 87               | Grady, S.J. 2003. A National Survey of Methyl tert-Butyl Ether and Other Volatile Organic Compounds in Drinking-Water Sources: Results of the Random Survey. U.S. Geological Survey Water-Resources Investigations Report 02-4079. 85 pp. Available on the Internet at: <a href="http://sd.water.usgs.gov/nawqa/pubs/wrir/wrir02_4079.pdf">http://sd.water.usgs.gov/nawqa/pubs/wrir/wrir02_4079.pdf</a> .                                                      |
| 287              | USEPA. 2008. Drinking Water Health Advisory for 1,1,2,2-Tetrachloroethane. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Health and Ecological Criteria Division, Washington, D.C.                                                                                                                                                                                                                                  |
| 291              | USEPA. 2008. Health Effects Support Document for 1,1,2,2-Tetrachloroethane. U.S. Environmental Protection Agency, Office of Water, Health and Ecological Criteria Division, Washington, D.C.                                                                                                                                                                                                                                                                   |
| 296              | USEPA. 2008. Regulatory Determinations Support Document for Selected Contaminants from the Second Drinking Water Contaminant Candidate List (CCL 2). EPA Report 815-R-08-012. June 2008.                                                                                                                                                                                                                                                                       |
| 297              | USEPA. 2008. The Analysis of Occurrence Data from the First Unregulated Contaminant Monitoring Regulation (UCMR 1) in Support of Regulatory Determinations for the Second Drinking Water Contaminant Candidate List. EPA 815-R-08-013. June.                                                                                                                                                                                                                   |
| 307              | USEPA. 2010. Chemical Assessment Summary, 1,1,2,2-Tetrachloroethane. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, D.C.                                                                                                                                                                                                                                           |

**1,2,3-Trichloropropane**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | 1,2,3-Trichloropropane        |
| CASRN:          | 96-18-4                       |
| DTXSID:         | <a href="#">DTXSID9021390</a> |
| Use:            | Paint ingredient              |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             |   |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| List                     | 140                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                      | Prevalence | Magnitude |
|---------|-------------------------------|------------|-----------|
| 7       | carcinogen with mutagenic MOA | 8          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect       | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.002                  | forestomach neoplasms | general population | IRIS              | 2009                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.28                         | 90th Percentile                               | Finished Water                       | UCMR3  | 2013-2015 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|-------------------|

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**1,2,3-Trichloropropane**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value  | Units          | Assessment Source | Critical Study   | Critical Effect                                                                                                       | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|----------------|-------------------|------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.006  | mg/kg/day      | OW 1989           | NTP 1983 a and b | effects on body and organ weights, hematological effects, changes in clinical chemistry and histopathological effects | general population | 33.8                        | 35.5       | [201]                    |       |
| Reference Dose (RfD) or Equivalent | 0.0057 | mg/kg/day      | CALEPA 2009       | NTP 1993         | effects on erythrocytes                                                                                               | general population | 33.8                        | 33.7       | [59]                     |       |
| Reference Dose (RfD) or Equivalent | 0.004  | mg/kg/day      | IRIS 2009         | NTP 1993         | increased absolute liver weight                                                                                       | general population | 33.8                        | 23.7       | [299]                    |       |
| Cancer Slope Factor (CSF)          | 25     | (mg/kg/day)^-1 | CALEPA 2009       | NTP 1993         | forestomach neoplasms                                                                                                 | general population | 33.8                        | 0.00118    | [59]                     |       |
| Cancer Slope Factor (CSF)          | 30     | (mg/kg/day)^-1 | IRIS 2009         | NTP 1993         | forestomach neoplasms                                                                                                 | general population | 33.8                        | 0.00230    | [299]                    |       |
| Cancer Classification (CC)         | L      |                | IRIS 2009         |                  |                                                                                                                       |                    |                             |            | [299]                    |       |
|                                    |        |                | ATSDR 1992        |                  |                                                                                                                       |                    |                             |            | [8]                      |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                      | Value         | Units     | Source                           | Notes |
|---------------------------------------------------|---------------|-----------|----------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |               |           |                                  |       |
| 10-day Health Advisory                            | 0.6           | mg/L      | EPA DWSHA 2018                   |       |
| Acute Health-Based Guidance Value                 | 0.007         | mg/L      | MN DOH                           |       |
| Acute Health-Based Guidance Value                 | 0.007         | mg/L      | MN DOH                           |       |
| Acute inhalation Minimal Risk Level (MRL)         | 0.0003        | ppm       | CDC ATSDR                        |       |
| Benchmark                                         | 0.000005      | mg/L      | CalEPA OEHHA Chemical Database   |       |
| Chronic Health-Based Guidance Value               | 0.0000003     | mg/L      | MN DOH                           |       |
| Chronic Health-Based Guidance Value               | 0.007         | mg/L      | MN DOH                           |       |
| Intermediate Minimal Risk Level (MRL)             | 0.06          | mg/kg/day | CDC ATSDR                        |       |
| Public Health Goal                                | 0.0000007     | mg/L      | CalEPA OEHHA Public Health Goals |       |
| Reference Concentration (RfC)                     | 0.0003        | mg/m^3    | EPA IRIS                         |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.007         | mg/L      | MN DOH                           |       |
| Cancer Classification (CC)                        | 2A            | no units  | WHO IARC                         |       |
| Cancer Classification (CC)                        | Female.Mice P | no units  | HHS NTP                          |       |
| Cancer Classification (CC)                        | Female.Rats P | no units  | HHS NTP                          |       |
| Cancer Classification (CC)                        | Male.Mice P   | no units  | HHS NTP                          |       |
| Cancer Classification (CC)                        | Male.Rats P   | no units  | HHS NTP                          |       |

| Data Element                                     | Value | Units     | Source                  | Notes |
|--------------------------------------------------|-------|-----------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                         |       |
| LD50                                             | 320   | mg/kg     | NIH HSDB                | min   |
| LD50                                             | 505   | mg/kg     | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 1.65  | percent   | EPA Chemistry Dashboard |       |
| TD50                                             | 0.806 | mg/kg/day | NIH CPDB                | min   |
| TD50                                             | 454   | mg/kg/day | NIH CPDB                | max   |

| Data Element             | Value      | Units    | Source    | Notes |
|--------------------------|------------|----------|-----------|-------|
| <b>Modeled Data</b>      |            |          |           |       |
| LD50                     | 0.00803526 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.673      | no units | TEST QSAR |       |
| Developmental toxin test | 0.462      | no units | TEST QSAR |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

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Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

1,2,3-Trichloropropane  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

July 2021

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 | 4,916                         | 67                | Sites              | 1.36                 | 0.03                    | 0.073                  | 0.28                      | 1.02                    | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 | 24,088                        | 19                | Sites              | 0.08                 | 0.03                    | 0.5                    | 16.6                      | 3000                    | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 | 17,392                        | 44                | Sites              | 0.25                 | 0.1                     | 0.915                  | 6                         | 112                     | ug/L        |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 7,695                         | 83                | Sites              | 1.08                 | 0.002                   | 0.2                    | 0.839                     | 2.92                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 265                           | 1                 | Sites              | 0.38                 | 0.12                    | 0.16                   | 0.179                     | 0.179                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 7,430                         | 82                | Sites              | 1.1                  | 0.002                   | 0.206                  | 0.851                     | 2.92                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) | 2                | 5,040                      | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 502                           | 69                | Sites               | 14                   | 0.001                   | 0.014                  | 0.6                       | 29                      | ug/L        |       |
| Drinking Water Monitoring Data - MA (Finished)                | 2006 - 2020 | 885                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WA (Finished)                | 2006 - 2011 | 1,204                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Community Water System Survey (CWSS) (Finished) [178]         | 2006        | 1                             | NA                | Sites               |                      |                         | 400                    | 400                       |                         | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 4,640                         | 373               | Sites               | 8.04                 | 0.0018                  | 0.032                  | 0.31                      | 270                     | ug/L        |       |
| Drinking Water Monitoring Data - FL (Source)                  | 2006 - 2011 | 3                             | 1                 | Sites               | 33                   | 1.9                     | 1.9                    | 1.9                       | 1.9                     | ug/L        |       |
| Drinking Water Monitoring Data - MA (Source)                  | 2006 - 2020 | 130                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - PA (Source)                  | 2006 - 2011 | 14                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WA (Source)                  | 2006 - 2011 | 1,690                         | 1                 | Sites               | 0.06                 | 0.0322                  | 0.0335                 | 0.0345                    | 0.0348                  | ug/L        |       |
| Drinking Water Monitoring Data - WI (Source)                  | 2012-2019   | 112                           | 1                 | Sites               | 0.89                 | 0.33                    | 0.33                   | 0.33                      | 0.33                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 222                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 3,422                         | 51                | Sites               | 1.49                 | 0.002                   | 0.0157                 | 0.161                     | 1.16                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 3,640                         | 51                | Sites               | 1.4                  | 0.002                   | 0.0157                 | 0.161                     | 1.16                    | ug/L        |       |
| Arnold et al. 2016 (Unfiltered) [7]                           | 2012 - 2013 | 685                           | 12                | Sites               | 1.75                 | 0.005                   | 0.0215                 | 0.132                     | 0.526                   | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                              | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Exposure exposure                               |      | 1.33E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) | < LOD                        | ng/ml |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.59332     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 147.27      | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 145.101     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 6.2604      | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 6.56145     | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0143205   | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0117761   | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 11.92       | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 16.1808     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000365755 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.27667     | no units                |       |

**1,2,3-Trichloropropane**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 8                | ATSDR. 1992. Toxicological Profile for 1,2,3-Trichloropropane. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                                                                                                                                                         |
| 59               | CalEPA. 2009. Public Health Goals for Chemicals in Drinking Water, 1,2,3-Trichloropropane. California Environmental Protection Agency (CalEPA), Office of Environmental Health Hazard Assessment, Pesticide and Environmental Toxicology Branch, Sacramento, CA.                                                                                                                                                                   |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                                                                                                                                                              |
| 201              | USEPA. 1989. 1,2,3-Trichloropropane Drinking Water Health Advisory. U.S. Environmental Protection Agency, Office of Water, Washington, D.C.                                                                                                                                                                                                                                                                                        |
| 299              | USEPA. 2009. Chemical Assessment Summary, 1,2,3-Trichloropropane. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, D.C.                                                                                                                                                                                                                  |

**1,2,4-Trimethylbenzene**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                  |
|-----------------|----------------------------------|
| Name:           | 1,2,4-Trimethylbenzene           |
| CASRN:          | 95-63-6                          |
| DTXSID:         | <a href="#">DTXSID6021402</a>    |
| Use:            | Chemical intermediate; vermifuge |
| Chemical Notes: |                                  |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxics                                 |  |
| PubMed Neurotoxics                                |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| List                     | 0.17                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 6          | 6         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect            | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 60                     | decreased pain sensitivity | general population | IRIS              | 2016                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 10                           | 90th Percentile                               | Finished Water                       | UCM1   | 1988-1992 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## 1,2,4-Trimethylbenzene

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study            | Critical Effect            | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                 |
|------------------------------------|-------|-----------|-------------------|---------------------------|----------------------------|--------------------|-----------------------------|------------|--------------------------|---------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.01  | mg/kg/day | IRIS 2016         | Korsak and Rydzynski 1996 | decreased pain sensitivity | general population | 33.8                        | 59.2       | [373]                    | NOTE: IRIS utilized PBPK modeling to extrapolate an oral RfD from an inhalation study |
| Cancer Classification (CC)         | D     |           | OW 1987           |                           |                            |                    |                             |            | [194]                    |                                                                                       |
| Cancer Classification (CC)         | D     |           | PPRTV 2007        |                           |                            |                    |                             |            | [278]                    |                                                                                       |
| Cancer Classification (CC)         | I     |           | IRIS 2016         |                           |                            |                    |                             |            | [373]                    | NOTE: IRIS utilized PBPK modeling to extrapolate an oral RfD from an inhalation study |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     | 2015-09-01           | 2020-04-06         | 17                                             | 0                                               | 0                                              |                                                   |

## Other Health Data

| Data Element                                      | Value | Units             | Source                         | Notes |
|---------------------------------------------------|-------|-------------------|--------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |       |                   |                                |       |
| Acute Health-Based Guidance Value                 | 0.1   | mg/L              | MN DOH                         |       |
| Benchmark                                         | 0.33  | mg/L              | CalEPA OEHHA Chemical Database |       |
| Chronic Health-Based Guidance Value               | 0.1   | mg/L              | MN DOH                         |       |
| Reference Concentration (RfC)                     | 0.06  | mg/m <sup>3</sup> | EPA IRIS                       |       |
| Reference Concentration (RfC)                     | 0.08  | mg/m <sup>3</sup> | EPA IRIS                       |       |
| Reference Concentration (RfC)                     | 0.2   | mg/m <sup>3</sup> | EPA IRIS                       |       |
| Reference Concentration (RfC)                     | 3     | mg/m <sup>3</sup> | EPA IRIS                       |       |
| Reference Concentration (RfC)                     | 4     | mg/m <sup>3</sup> | EPA IRIS                       |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.1   | mg/L              | MN DOH                         |       |
| Subchronic Provisional RfD                        | 0.04  | mg/m <sup>3</sup> | EPA IRIS                       |       |
| Subchronic Provisional RfD                        | 0.04  | mg/m <sup>3</sup> | EPA IRIS                       |       |

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 3280  | mg/kg   | NIH HSDB                | min   |
| LD50                                             | 6000  | mg/kg   | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 0.9   | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0282488 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   |           |          | TEST QSAR |       |
| Developmental toxin test | 0.482     | no units | TEST QSAR |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.



Technical Support Document for the  
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1,2,4-Trimethylbenzene

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OCCURRENCE DATA

Scoring Data

| Nationally Representative Water Data                           | Date                    | Number of PWS/ Sites/ Samples    | Number of Detects | PWS/Sites/ Samples                                 | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects)  | 90th Percentile (Detects)         | Maximum Conc. (Detects)                            | Conc. Units | Notes |
|----------------------------------------------------------------|-------------------------|----------------------------------|-------------------|----------------------------------------------------|----------------------|-------------------------|-------------------------|-----------------------------------|----------------------------------------------------|-------------|-------|
| <b>Finished Water</b>                                          |                         |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997             | 22,965                           | 174               | Sites                                              | 0.76                 | 0.1                     | 0.8                     | 5.42                              | 137                                                | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992             | 12,755                           | 106               | Sites                                              | 0.83                 | 0.02                    | 1                       | 10                                | 77                                                 | ug/L        |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |       |
| <b>Ambient Water</b>                                           |                         |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017             | 7,705                            | 695               | Sites                                              | 9.02                 | 0.004                   | 0.03                    | 0.199                             | 260                                                | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017             | 265                              | 76                | Sites                                              | 29                   | 0.005                   | 0.0255                  | 0.21                              | 3.6                                                | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017             | 7,440                            | 619               | Sites                                              | 8.32                 | 0.004                   | 0.033                   | 0.196                             | 260                                                | ug/L        |       |
| <b>Pesticide Application Data</b>                              | <b>Number of States</b> | <b>Amount Applied (lbs/year)</b> | <b>Date</b>       | <b>Toxic Release Data</b>                          |                      |                         | <b>Number of States</b> | <b>Amount Released (lbs/year)</b> | <b>Chemical Production Data</b>                    |             |       |
| Estimated Annual Agricultural Pesticide Use (USGS)             |                         |                                  |                   | Toxic Release Inventory (TRI) Program (EPA) (2016) |                      |                         | 50                      | 6,616,209                         | Chemical Data Reporting (CDR) Results (EPA) (2016) |             |       |
|                                                                |                         |                                  |                   |                                                    |                      |                         |                         |                                   | 250M - 500M                                        |             |       |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 405                           | 5                 | Sites               | 1.23                 | 0.039                   | 1.15                   | 8.02                      | 22.3                    | ug/L        |       |
| Drinking Water Monitoring Data - MA (Finished)                | 2006 - 2020 | 884                           | 11                | Sites               | 1.24                 | 0.5                     | 0.68                   | 2.1                       | 2.4                     | ug/L        |       |
| Drinking Water Monitoring Data - WA (Finished)                | 2006 - 2011 | 1,188                         | 1                 | Sites               | 0.08                 | 1.4                     | 1.4                    | 1.4                       | 1.4                     | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 4,250                         | 14                | Sites               | 0.33                 | 0.034                   | 0.645                  | 2.45                      | 3.5                     | ug/L        |       |
| Drinking Water Monitoring Data - MA (Source)                  | 2006 - 2020 | 130                           | 2                 | Sites               | 1.54                 | 0.6                     | 0.79                   | 0.798                     | 0.8                     | ug/L        |       |
| Drinking Water Monitoring Data - PA (Source)                  | 2006 - 2011 | 13                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WA (Source)                  | 2006 - 2011 | 1,665                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WI (Source)                  | 2012-2019   | 101                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 219                           | 13                | Sites               | 5.94                 | 0.011                   | 0.033                  | 0.0545                    | 0.072                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 3,487                         | 204               | Sites               | 5.85                 | 0.01                    | 0.0525                 | 0.304                     | 180                     | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 3,703                         | 217               | Sites               | 5.86                 | 0.01                    | 0.047                  | 0.299                     | 180                     | ug/L        |       |
| Arnold et al. 2016 (Unfiltered) [7]                           | 2012 - 2013 | 685                           | 18                | Sites               | 2.63                 | 0.012                   | 0.039                  | 0.161                     | 0.274                   | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.0000518                               |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.62726     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 169.007     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 178.053     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 1.87805     | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 1.49279     | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000492809 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00155239  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 144.739     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 218.776     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.00706473  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.61901     | no units                |       |

**1,2,4-Trimethylbenzene**

CCL 5 Contaminant Information Sheet

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 194              | USEPA. 1987. Drinking Water Health Advisory for 1,2,4-trimethylbenzene. U.S. Environmental Protection Agency, Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH.                                                                                                                                                                                                         |
| 278              | USEPA. 2007. Provisional Peer-Reviewed Toxicity Values for 1,2,4-Trimethylbenzene. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH.                                                                                                                                                         |
| 373              | USEPA. 2016. Toxicological Review of Trimethylbenzenes. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, D.C.                                                                                                                                                                                        |

**1,3-Butadiene**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | 1,3-Butadiene                 |
| CASRN:          | 106-99-0                      |
| DTXSID:         | <a href="#">DTXSID3020203</a> |
| Use:            | Rubber chemical               |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 |                            |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity | Prevalence | Magnitude |
|---------|----------|------------|-----------|
|         |          | 1          | 6         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect | Target Pop. | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------|-------------|-------------------|----------------------|
|                                                          |                        |                 |             | IRIS              | 2002                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.518                        | 90th Percentile                               | Finished Water                       | UCMR3  | 2013-2015 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**1,3-Butadiene**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element               | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                                                                               |
|----------------------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Cancer Classification (CC) | B2    |       | IRIS 2002         |                |                 |                   |                             |            | [249]                    | NOTE: according to IRIS: "Oral RfD not calculated because 1,3-butadiene is a gas, is poorly soluble in water, and causes hazard by inhalation only" |
|                            |       |       | ATSDR 2012        |                |                 |                   |                             |            | [29]                     |                                                                                                                                                     |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element              | Value | Units                     | Assessment Source | Critical Study      | Critical Effect                         | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|---------------------------|-------|---------------------------|-------------------|---------------------|-----------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-------|
| Cancer Slope Factor (CSF) | 0.6   | (mg/kg/day) <sup>-1</sup> | CALEPA 2009       | Melnick et al. 1990 | lung alveolar and bronchiolar neoplasms | general population | 33.8                        | 0.0493                     | [60]                     |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     | 2001-11-01           | 2020-02-13         | 1334                                           | 0                                               | 45                                             |                                                   |

**Other Health Data**

| Data Element                                | Value          | Units                              | Source                         | Notes |
|---------------------------------------------|----------------|------------------------------------|--------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |                |                                    |                                |       |
| Cancer Classification (CC)                  | 1              | no units                           | WHO IARC                       |       |
| Cancer Slope Factor (CSF)                   | 0.6            | (mg/kg/day) <sup>-1</sup>          | CalEPA OEHHA Chemical Database |       |
| Inhalation Unit Risk (IUR)                  | 0.00017        | ug/m <sup>3</sup>                  | CalEPA OEHHA Chemical Database |       |
| Inhalation Unit Risk (IUR)                  | 0.00003        | (ug/m <sup>3</sup> ) <sup>-1</sup> | EPA IRIS                       |       |
| Reference Concentration (RfC)               | 2              | ug/m <sup>3</sup>                  | CalEPA OEHHA Chemical Database |       |
| Reference Concentration (RfC)               | 0.002          | mg/m <sup>3</sup>                  | EPA IRIS                       |       |
| Cancer Classification (CC)                  | Female.Mice P  | no units                           | HHS NTP                        |       |
| Cancer Classification (CC)                  | Female.Mice P  | no units                           | HHS NTP                        |       |
| Cancer Classification (CC)                  | Female.Rats NT | no units                           | HHS NTP                        |       |
| Cancer Classification (CC)                  | Female.Rats NT | no units                           | HHS NTP                        |       |
| Cancer Classification (CC)                  | Male.Mice P    | no units                           | HHS NTP                        |       |
| Cancer Classification (CC)                  | Male.Mice P    | no units                           | HHS NTP                        |       |
| Cancer Classification (CC)                  | Male.Rats NT   | no units                           | HHS NTP                        |       |
| Cancer Classification (CC)                  | Male.Rats NT   | no units                           | HHS NTP                        |       |

| Data Element                                | Value | Units | Source   | Notes |
|---------------------------------------------|-------|-------|----------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |          |       |
| LD50                                        | 5480  | mg/kg | NIH HSDB |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0291072 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   |           |          | TEST QSAR |       |
| Developmental toxin test | 0.572     | no units | TEST QSAR |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

1,3-Butadiene

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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OCCURRENCE DATA

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 | 4,916                         | 2                 | Sites              | 0.04                 | 0.32                    | 0.43                   | 0.518                     | 0.54                    | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,411                         | 1                 | Sites              | 0.07                 | 0.649                   | 0.649                  | 0.649                     | 0.649                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 51                            | 1                 | Sites              | 1.96                 | 0.649                   | 0.649                  | 0.649                     | 0.649                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,360                         | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) | 33               | 1,241,320                  | Chemical Data Reporting (CDR) Results (EPA) (2016) | 18 - 58                      |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 47                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 824                           | 1                 | Sites               | 0.12                 | 0.81                    | 0.81                   | 0.81                      | 0.81                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 871                           | 1                 | Sites               | 0.11                 | 0.81                    | 0.81                   | 0.81                      | 0.81                    | ug/L        |       |
| Arnold et al. 2016 (Unfiltered) [7]                           | 2012 - 2013 | 527                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      |                                         |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value     | Units                   | Notes |
|----------------------------------------------------------------|------------|-----------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 7.4766    | days                    |       |
| Boiling point                                                  | OPERA QSAR | 2.82833   | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 18.339    | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 1266.91   | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 1213.39   | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0170752 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.021727  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 11.0376   | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 7.31139   | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.0679036 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 1.92103   | no units                |       |

**1,3-Butadiene**

CCL 5 Contaminant Information Sheet

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 29               | ATSDR. 2012. Toxicological Profile for 1,3-Butadiene. U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                                                                                                                                                                                         |
| 60               | CalEPA. 2009. Technical Support Document for Cancer Potency Factors, Appendix B. California Environmental Protection Agency (CalEPA), Office of Environmental Health Hazard Assessment, Air Toxicology and Epidemiology Branch, Sacramento, CA.                                                                                                                                                                                    |
| 249              | USEPA. 2002. Chemical Assessment Summary, 1,3-Butadiene. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, D.C.                                                                                                                                                                                                                           |

**1,3-Dichloropropene**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                 |
|-----------------|---------------------------------|
| Name:           | 1,3-Dichloropropene             |
| CASRN:          | 542-75-6                        |
| DTXSID:         | <a href="#">DTXSID1022057</a>   |
| Use:            | pesticide; in organic synthesis |
| Chemical Notes: |                                 |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              | X |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 8.2                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 5       | carcinogen with linear MOA | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                    | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.2                    | forestomach, liver, adrenal, and thyroid tumors found in male rats | general population | OPP               | 2008                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 1.63                         | 90th Percentile                               | Finished Water                       | UCM1   | 1988-1992 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2 | RD 3           |
|----------------|------|----------------|
| Not Applicable | X    | Not Applicable |

**Basis**

1,3-DCP appears to occur infrequently at health levels of concern in PWSS. While 1,3-DCP was detected in the UCM Round 1 (late 1980's) and the UCM Round 2 (mid 1990's) surveys [a], it was not detected in a subsequent evaluation of 796 small systems from the UCMR 1 survey [b]. In addition, the USGS did not detect 1,3-DCP in two occurrence studies performed between 1999 and 2001 using monitoring levels that were lower than the HRL [c,d]. EPA believes the 1999 pesticide labeling requirements, which are intended to mitigate risks to drinking water, may be one reason for the lack of occurrence of 1,3-DCP at levels of concern in subsequent monitoring surveys.

[a] USEPA, 2008 [298]; [b] USEPA, 2008 [297]; [c] Grady, 2003 [87]; [d] Delzer & Ivahnenko, 2003 [68]; as cited in USEPA, 2008 [296]

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## 1,3-Dichloropropene

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units                     | Assessment Source | Critical Study              | Critical Effect                                                                                          | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|---------------------------|-------------------|-----------------------------|----------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.025 | mg/kg/day                 | OPP 2008          | Stott et al. 1995           | decreased body weight gain, increased incidence of basal cell hyperplasia of nonglandular stomach mucosa | general population | 33.8                        | 148        | [285]                    |       |
| Cancer Slope Factor (CSF)          | 0.122 | (mg/kg/day) <sup>-1</sup> | OPP 2008          | NTP 1985; Stott et al. 1995 | forestomach, liver, adrenal, and thyroid tumors found in male rats                                       | general population | 33.8                        | 0.243      | [285]                    |       |
| Cancer Classification (CC)         | L     |                           | OPP 2008          |                             |                                                                                                          |                    |                             |            | [285]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References Identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                     | Value          | Units                              | Source                                | Notes |
|--------------------------------------------------|----------------|------------------------------------|---------------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |                |                                    |                                       |       |
| 10-day Health Advisory                           | 0.03           | mg/L                               | EPA DWSHA 2018                        |       |
| Cancer Slope Factor (CSF)                        | 0.091          | (mg/kg/day) <sup>-1</sup>          | CalEPA OEHHA Chemical Database        |       |
| Chronic Health-Based Guidance Value              | 0.0002         | mg/L                               | MN DOH                                |       |
| Chronic inhalation Minimal Risk Level (MRL)      | 0.007          | ppm                                | CDC ATSDR                             |       |
| Drinking Water Guideline Value                   | 0.02           | mg/L                               | WHO Drinking Water Quality Guidelines |       |
| Human Health Ambient Water Quality Criteria      | 0.00027        | mg/L                               | EPA Human Health Criteria for CWA     |       |
| Inhalation Unit Risk (IUR)                       | 0.000004       | (ug/m <sup>3</sup> ) <sup>-1</sup> | EPA IRIS                              |       |
| Intermediate Inhalation Minimal Risk Level (MRL) | 0.008          | ppm                                | CDC ATSDR                             |       |
| Intermediate Minimal Risk Level (MRL)            | 0.04           | mg/kg/day                          | CDC ATSDR                             |       |
| Lifetime Health Advisory                         | 0.0004         | mg/L                               | EPA DWSHA 2018                        |       |
| Public Health Goal                               | 0.0002         | mg/L                               | CalEPA OEHHA Public Health Goals      |       |
| Reference Concentration (RfC)                    | 0.02           | mg/m <sup>3</sup>                  | EPA IRIS                              |       |
| Cancer Classification (CC)                       | 2B             | no units                           | WHO IARC                              |       |
| Cancer Classification (CC)                       | Female.Mice P  | no units                           | HHS NTP                               |       |
| Cancer Classification (CC)                       | Female.Rats SE | no units                           | HHS NTP                               |       |
| Cancer Classification (CC)                       | Male.Mice IS   | no units                           | HHS NTP                               |       |
| Cancer Classification (CC)                       | Male.Rats P    | no units                           | HHS NTP                               |       |

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 713   | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 94    | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 12.5  | mg/kg/day | EPA Toxicity Reference Database |       |
| NOAEL                                            | 2.5   | mg/kg/day | EPA Toxicity Reference Database |       |
| Percent of active toxcast in vitro assays tested | 0     | percent   | EPA Chemistry Dashboard         |       |
| TD50                                             | 1930  | mg/kg/day | NIH CPDB                        | max   |
| TD50                                             | 33.2  | mg/kg/day | NIH CPDB                        | min   |

| Data Element             | Value      | Units    | Source    | Notes |
|--------------------------|------------|----------|-----------|-------|
| <b>Modeled Data</b>      |            |          |           |       |
| LD50                     | 0.00398107 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 1.133      | no units | TEST QSAR |       |
| Developmental toxin test | 0.342      | no units | TEST QSAR |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.



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EPA - Office of Water

1,3-Dichloropropene

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OCCURRENCE DATA

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 | 796                           | 0                 | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 | 16,787                        | 58                | Sites               | 0.35                 | 0.2                     | 0.5                    | 0.99                      | 39                      | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 | 9,164                         | 15                | Sites               | 0.16                 | 0.5                     | 1                      | 1.63                      | 2                       | ug/L        |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 24               | 59,344,846                | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 10               | 7,907                      | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 464                           | 2                 | Sites               | 0.43                 | 0.5                     | 1                      | 1                         | 1                       | ug/L        |       |
| Drinking Water Monitoring Data - MA (Finished)                                         | 2006 - 2020 | 879                           | 1                 | Sites               | 0.11                 | 1.3                     | 1.3                    | 1.3                       | 1.3                     | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 4,667                         | 5                 | Sites               | 0.11                 | 0.52                    | 0.605                  |                           | 10                      | ug/L        |       |
| Drinking Water Monitoring Data - FL (Source)                                           | 2006 - 2011 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - MA (Source)                                           | 2006 - 2020 | 129                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - PA (Source)                                           | 2006 - 2011 | 13                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WI (Source)                                           | 2012-2019   | 112                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 94                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 3.56E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|----------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 5.3718     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 97.6161    | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 97.43      | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 31.8587    | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 41.9759    | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0196733  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0229087  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 7.94771    | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 12.3027    | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.00202678 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.02743    | no units                |       |

**1,3-Dichloropropene**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 68               | Delzer, G.C. and T. Ivahnenko. 2003. Occurrence and Temporal Variability of Methyl tertButyl Ether (MTBE) and Other Volatile Organic Compounds in Select Sources of Drinking Water: Results of the Focused Survey. U.S. Geological Survey WaterResources Investigations Report 02-4084. 65 pp. Available on the Internet at: <a href="http://sd.water.usgs.gov/nawqa/pubs/wrir/wrir02_4084.pdf">http://sd.water.usgs.gov/nawqa/pubs/wrir/wrir02_4084.pdf</a> . |
| 87               | Grady, S.J. 2003. A National Survey of Methyl tert-Butyl Ether and Other Volatile Organic Compounds in Drinking-Water Sources: Results of the Random Survey. U.S. Geological Survey Water-Resources Investigations Report 02-4079. 85 pp. Available on the Internet at: <a href="http://sd.water.usgs.gov/nawqa/pubs/wrir/wrir02_4079.pdf">http://sd.water.usgs.gov/nawqa/pubs/wrir/wrir02_4079.pdf</a> .                                                      |
| 285              | USEPA. 2008. 1,3-Dichloropropene: Proposed New Use for Drip Irrigation in Vineyards: Revised HED Human Health Risk Assessment. EPA-HQ-OPP-2013-0154-0006. DP No. D347789. U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Washington, D.C.                                                                                                                                                                        |
| 296              | USEPA. 2008. Regulatory Determinations Support Document for Selected Contaminants from the Second Drinking Water Contaminant Candidate List (CCL 2). EPA Report 815-R-08-012. June 2008.                                                                                                                                                                                                                                                                       |
| 297              | USEPA. 2008. The Analysis of Occurrence Data from the First Unregulated Contaminant Monitoring Regulation (UCMR 1) in Support of Regulatory Determinations for the Second Drinking Water Contaminant Candidate List. EPA 815-R-08-013. June.                                                                                                                                                                                                                   |
| 298              | USEPA. 2008. The Analysis of Occurrence Data from the Unregulated Contaminant Monitoring (UCM) Program and National Inorganics and Radionuclides Survey (NIRS) in Support of Regulatory Determinations for the Second Drinking Water Contaminant Candidate List. EPA 815-D-08-014. June.                                                                                                                                                                       |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                                                |

**1,4-Dioxane**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | 1,4-Dioxane                   |
| CASRN:          | 123-91-1                      |
| DTXSID:         | <a href="#">DTXSID4020533</a> |
| Use:            | Solvent; solvent stabilizer   |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 3.1                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 5       | carcinogen with linear MOA | 10         | 5         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                   | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.3                    | hepatocellular adenomas and carcinomas in females | general population | IRIS              | 2010                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date        |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-------------|
| 0.93                         | 90th Percentile                               | Finished Water                       | UCMR3  | 2013 - 2015 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
| X                 |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

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HEALTH EFFECTS DATA

Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units                     | Assessment Source | Critical Study                          | Critical Effect                                                       | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|---------------------------|-------------------|-----------------------------------------|-----------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.1    | mg/kg/day                 | ATSDR 2012        | Kociba et al. 1974                      | liver effects in male rats                                            | general population | 33.8                        | 592        | [30]                     |       |
| Reference Dose (RfD) or Equivalent | 0.03   | mg/kg/day                 | IRIS 2010         | Kociba et al. 1974                      | liver and kidney toxicity                                             | general population | 33.8                        | 178        | [308]                    |       |
| Reference Dose (RfD) or Equivalent | 0.096  | mg/kg/day                 | WHO 2005          | Kociba et al. 1974                      | renal tubular epithelial and hepatocellular degeneration and necrosis | general population | 33.8                        | 568        | [439]                    |       |
| Reference Dose (RfD) or Equivalent | 0.0054 | mg/kg/day                 | HC 2018           | Kociba et al. 1974; Dourson et al. 2014 | hepatocellular necrosis                                               | general population | 33.8                        | 32.0       | [95]                     |       |
| Cancer Slope Factor (CSF)          | 0.1    | (mg/kg/day) <sup>-1</sup> | IRIS 2010         | Kano et al. 2009                        | hepatocellular adenomas and carcinomas in female mice                 | general population | 33.8                        | 0.296      | [308]                    |       |
| Cancer Classification (CC)         | L      |                           | IRIS 2010         |                                         |                                                                       |                    |                             |            | [308]                    |       |

Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Hepatic, Systemic           | 440                         | Gi, 2018           | Hepatic                      | 562                          | Gi, 2018            |                      |                    |                                                |                                                 |                                                | 1                                                 |

Other Health Data

| Data Element                                      | Value         | Units                              | Source                                | Notes |
|---------------------------------------------------|---------------|------------------------------------|---------------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |               |                                    |                                       |       |
| 10-day Health Advisory                            | 0.4           | mg/L                               | EPA DWSHA 2018                        |       |
| Acute inhalation Minimal Risk Level (MRL)         | 2             | ppm                                | CDC ATSDR                             |       |
| Benchmark                                         | 0.001         | mg/L                               | CalEPA OEHH Chemical Database         |       |
| Cancer Slope Factor (CSF)                         | 0.027         | (mg/kg/day) <sup>-1</sup>          | CalEPA OEHH Chemical Database         |       |
| Chronic Health-Based Guidance Value               | 0.1           | mg/L                               | MN DOH                                |       |
| Chronic Health-Based Guidance Value               | 0.0001        | mg/L                               | MN DOH                                |       |
| Chronic inhalation Minimal Risk Level (MRL)       | 0.03          | ppm                                | CDC ATSDR                             |       |
| Drinking Water Guideline Value                    | 0.05          | mg/L                               | WHO Drinking Water Quality Guidelines |       |
| Inhalation Unit Risk (IUR)                        | 0.000005      | (ug/m <sup>3</sup> ) <sup>-1</sup> | EPA IRIS                              |       |
| Inhalation Unit Risk (IUR)                        | 0.0000077     | ug/m <sup>3</sup>                  | CalEPA OEHH Chemical Database         |       |
| Intermediate Inhalation Minimal Risk Level (MRL)  | 0.2           | ppm                                | CDC ATSDR                             |       |
| Intermediate Minimal Risk Level (MRL)             | 0.5           | mg/kg/day                          | CDC ATSDR                             |       |
| Lifetime Health Advisory                          | 0.2           | mg/L                               | EPA DWSHA 2018                        |       |
| Lifetime Health Advisory                          | 0.00035       | mg/L                               | EPA DWSHA 2018                        |       |
| Reference Concentration (RfC)                     | 0.03          | mg/m <sup>3</sup>                  | EPA IRIS                              |       |
| Reference Concentration (RfC)                     | 3000          | ug/m <sup>3</sup>                  | CalEPA OEHH Chemical Database         |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.3           | mg/L                               | MN DOH                                |       |
| Cancer Classification (CC)                        | 2B            | no units                           | WHO IARC                              |       |
| Cancer Classification (CC)                        | Female.Mice P | no units                           | HHS NTP                               |       |
| Cancer Classification (CC)                        | Female.Rats P | no units                           | HHS NTP                               |       |
| Cancer Classification (CC)                        | Male.Mice P   | no units                           | HHS NTP                               |       |
| Cancer Classification (CC)                        | Male.Rats P   | no units                           | HHS NTP                               |       |

| Data Element                                     | Value | Units     | Source                  | Notes |
|--------------------------------------------------|-------|-----------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                         |       |
| LD50                                             | 2000  | mg/kg     | NIH HSDB                | min   |
| LD50                                             | 5700  | mg/kg     | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 0.85  | percent   | EPA Chemistry Dashboard |       |
| TD50                                             | 40.5  | mg/kg/day | NIH CPDB                | min   |
| TD50                                             | 71900 | mg/kg/day | NIH CPDB                | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0335738 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.069     | no units | TEST QSAR |       |
| Developmental toxin test | 0.408     | no units | TEST QSAR |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 | 4,915                         | 1,077             | Sites              | 22                   | 0.07                    | 0.17                   | 0.93                      | 34                      | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,406                         | 8                 | Sites              | 0.57                 | 0.568                   | 1.83                   | 16.5                      | 18.9                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 51                            | 5                 | Sites              | 9.8                  | 0.568                   | 2.06                   | 17.6                      | 18.9                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,355                         | 3                 | Sites              | 0.22                 | 0.9                     | 1.83                   | 3.06                      | 3.58                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) | 24               | 617,134                    | Chemical Data Reporting (CDR) Results (EPA) (2016) | 1M - 10M                     |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 42                            | 18                | Sites               | 43                   | 0.5                     | 1.5                    | 3.2                       | 9.1                     | ug/L        |       |
| Drinking Water Monitoring Data - MA (Finished)                | 2006 - 2020 | 10                            | 8                 | Sites               | 80                   | 0.0081                  | 0.2                    | 0.51                      | 1.1                     | ug/L        |       |
| Community Water System Survey (CWSS) (Finished) [178]         | 2006        | 1                             | NA                | Sites               |                      |                         | 0.8                    | 1.4                       |                         | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 274                           | 67                | Sites               | 24                   | 0.27                    | 2                      | 5.9                       | 36                      | ug/L        |       |
| Drinking Water Monitoring Data - MA (Source)                  | 2006 - 2020 | 6                             | 5                 | Sites               | 83                   | 0.0272                  | 0.24                   | 1.3                       | 3.5                     | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 114                           | 16                | Sites               | 14                   | 0.124                   | 1.32                   | 6.94                      | 15.9                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 955                           | 105               | Sites               | 11                   | 0.083                   | 3.3                    | 7.6                       | 36                      | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,068                         | 121               | Sites               | 11                   | 0.083                   | 3.2                    | 7.6                       | 36                      | ug/L        |       |
| Community Water System Survey (CWSS) (Ambient) [178]          | 2006        | 1                             | NA                | Sites               |                      |                         | 0.9                    | 1.3                       |                         | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                            | 4                 | Sites               | 11                   | 0.7226                  | 0.987                  | 2.77                      | 3.537                   | ug/L        |       |
| Arnold et al. 2016 (Unfiltered) [7]                           | 2012 - 2013 | 527                           | 2                 | Sites               | 0.38                 | 1                       | 1.5                    | 1.9                       | 2                       | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.0000011                               |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) | < LOD                        | ng/ml |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value     | Units                   | Notes |
|----------------------------------------------------------------|------------|-----------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 10.227    | days                    |       |
| Boiling point                                                  | OPERA QSAR | 101.678   | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 99.984    | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 41.0426   | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 46.9894   | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 11.2319   | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 4.7863    | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 0.779115  | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 1.49968   | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.0000147 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | -0.200282 | no units                |       |

**1,4-Dioxane**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 30               | ATSDR. 2012. Toxicological Profile for 1,4-Dioxane. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                                                                                                                                                                    |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. Environmental science & technology, 51(9), 4792-4802.                                                                                                                                               |
| 95               | HC. 2018. Guideline Technical Document for Public Consultation, 1,4-Dioxane in Drinking Water. Health Canada (HC), Ottawa, Ontario, Canada.                                                                                                                                                                                                                                                                                        |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                                                                                                                                                              |
| 308              | USEPA. 2010. Chemical Assessment Summary, 1,4-Dioxane. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington D.C.                                                                                                                                                                                                                              |
| 439              | WHO. 2005. 1,4-Dioxane in Drinking-water. WHO Guidelines for Drinking-water Quality. World Health Organization (WHO), Geneva, Switzerland.                                                                                                                                                                                                                                                                                         |

**1-Butanol**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                     |
|-----------------|-----------------------------------------------------|
| Name:           | 1-Butanol                                           |
| CASRN:          | 71-36-3                                             |
| DTXSID:         | <a href="#">DTXSID1021740</a>                       |
| Use:            | Paint solvent; chemical intermediate; food additive |
| Chemical Notes: |                                                     |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxicants                              |  |
| PubMed Neurotoxicants                             |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.016                      |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 4       | non-cancer effects | 9          | 8         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect         | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 600                    | ataxia and hypoactivity | general population | IRIS              | 1987                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 9.64712                      | 90th Percentile                               | Finished Water                       | UCMR4  | 2018-2019 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**1-Butanol**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect         | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|-------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.1   | mg/kg/day | IRIS 1987         | USEPA 1986     | hypoactivity and ataxia | general population | 33.8                        | 592        | [193]                    |       |
| Cancer Classification (CC)         | D     |           | IRIS 1987         |                |                         |                    |                             |            | [193]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Developmental               | 300                         | Sitarek, 1994      | Reproductive                 | 5654                         | Ema, 2005           | 1986-03-01           | 2020-03-16         | 4072                                           | 2                                               | 8                                              | 2                                                 |

**Other Health Data**

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
| Chronic Health-Based Guidance Value         | 0.7   | mg/L  | MN DOH |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 790   | mg/kg   | NIH HSDB                |       |
| Percent of active toxcast in vitro assays tested | 1.23  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0105439 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.112     | no units | TEST QSAR |       |
| Developmental toxin test | 0.677     | no units | TEST QSAR |       |



## 1-Butanol

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 | 3,689                               | 145                  | Sites                 | 3.93                    | 2                          | 3.5                       | 9.65                         | 101.5552                   | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,406                               | 0                    | Sites                 | 0                       |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 51                                  | 0                    | Sites                 | 0                       |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,355                               | 0                    | Sites                 | 0                       |                            |                           |                              |                            |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) | 46                  | 9,818,559                     | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) | 1B - 5B                      |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 43                                  | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 1,104                               | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,147                               | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                                  | 1                    | Sites                  | 2.63                    | 5.743                      | 5.74                      | 5.74                         | 5.743                      | ug/L        |       |
| Arnold et al. 2016 (Unfiltered) [7]                           | 2012 - 2013 | 527                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water                              | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Exposure exposure                                  |      | 0.0000587                                     |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|-------------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 4.44861    | days                    |       |
| Boiling point                                                     | OPERA QSAR | 111.366    | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 118.364    | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 7.55899    | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 5.29663    | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 1.20266    | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.626614   | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 4.82083    | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 3.34965    | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.00000978 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 0.850878   | no units                |       |

**1-Butanol**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 193              | USEPA. 1987. Chemical Assessment Summary, n-Butanol. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, D.C.                                                                                                                                                                                                                               |

**1H-Benzotriazole, 4(or 5)-methyl-**  
CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                        |                                                                   |
|------------------------|-------------------------------------------------------------------|
| <b>Name:</b>           | 1H-Benzotriazole, 4(or 5)-methyl-                                 |
| <b>CASRN:</b>          | 29385-43-1                                                        |
| <b>DTXSID:</b>         | <a href="#">DTXSID0026171</a>                                     |
| <b>Use:</b>            | In water treatment, corrosion inhibitor for copper and its alloys |
| <b>Chemical Notes:</b> |                                                                   |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxics                                 |  |
| PubMed Neurotoxics                                |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

**CONTAMINANT SUMMARY & DECISION**

|                                 |                                   |
|---------------------------------|-----------------------------------|
| <b>Draft CCL5 List Decision</b> | <b>Final Hazard Quotient (HQ)</b> |
| Not List                        | 0.0091                            |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 10         | 5         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                    | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 100                    | renal proximal tubule regeneration | general population | MDH               | 2019                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.9104                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                          |
|--------------------------|
| <b>Public Nomination</b> |
|                          |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

1H-Benzotriazole, 4(or 5)-methyl-  
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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                    | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                             |
|------------------------------------|-------|-----------|-------------------|----------------|------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.017 | mg/kg/day | MDH 2019          | JBRC 2007      | renal proximal tubule regeneration | general population | 33.8                        | 101                        | [148]                    | NOTE: the toxicity value was derived from a surrogate chemical (1H-benzotriazole) |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      | 2020-03-13         | 86                                             | 1                                               | 2                                              | 0                                                 |

## Other Health Data

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 800   | mg/kg   | NIH HSDB                |       |
| Percent of active toxcast in vitro assays tested | 5.14  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value | Units | Source    | Notes |
|--------------------------|-------|-------|-----------|-------|
| <b>Modeled Data</b>      |       |       |           |       |
| LD50                     |       |       | TEST QSAR |       |
| Ames mutagenicity test   |       |       | TEST QSAR |       |
| Developmental toxin test |       |       | TEST QSAR |       |

1H-Benzotriazole, 4(or 5)-methyl-  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

July 2021

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 557                           | 62                | Sites              | 11                   | 0.00672                 | 0.242                  | 0.91                      | 4.17                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 75                            | 51                | Sites              | 68                   | 0.00672                 | 0.256                  | 0.912                     | 4.17                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 482                           | 11                | Sites              | 2.28                 | 0.0284                  | 0.0506                 | 0.366                     | 2.98                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) | 1M - 10M                     |

## Non-Scoring Data

| Non-Nationally Representative Water Data | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                    |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Bradley et al. 2018 (Finished) [53]      | 2016        | 26                            | 3                 | Sites               | 12                   | 0.0130716               | 0.0333                 | 0.0352                    | 0.0357109               | ug/L        |       |
| <b>Ambient Water</b>                     |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Bradley et al. 2017 (Ambient) [52]       | 2012 - 2014 | 38                            | 20                | Sites               | 53                   | 0.0213052               | 0.664                  | 2.33                      | 4.6612843               | ug/L        |       |
| <b>Waste Water Effluent</b>              |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]     | 2011 - 2017 | 21                            | 20                | Sites               | 95                   | 0.1313613               | 1.36                   | 9.3                       | 27.69201                | ug/L        |       |
| Estimated Concentration in Water         | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                                  |      | 0.000000337                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

**1H-Benzotriazole, 4(or 5)-methyl-**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                  |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985. |
| 148              | MDH. 2019. Toxicological Summary for: Tolytriazole and 5-Methyl-1H-Benzotriazole. Health Based Guidance for Water. Minnesota Department of Health (MDH), Environmental Health Division, Health Risk Assessment Unit, St Paul, MN.                                                                                                                               |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                                                                |

## 17-alpha-Ethynyl estradiol

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

## CONTAMINANT IDENTIFYING INFORMATION

|                 |                               |
|-----------------|-------------------------------|
| Name:           | 17-alpha-Ethynyl estradiol    |
| CASRN:          | 57-63-6                       |
| DTXSID:         | <a href="#">DTXSID5020576</a> |
| Use:            | Pharmaceutical, hormone       |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 21                         |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 10      | reproductive and developmental effects | 4          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                               | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 0.00007                | lowest therapeutic dose: synthetic estrogen for birth control | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.001452                     | 90th Percentile                               | Finished Water                       | UCMR3  | 2013-2015 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## 17-alpha-Ethinyl estradiol

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|--------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                          |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value       | Units     | Assessment Source  | Critical Study      | Critical Effect                                               | Target Population  | Exposure Factor (mL/kg-) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                     |
|------------------------------------|-------------|-----------|--------------------|---------------------|---------------------------------------------------------------|--------------------|--------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 1.04167E-08 | mg/kg/day | FDA 2018; NIH 2018 | Allergan, Inc. 2017 | lowest therapeutic dose: synthetic estrogen for birth control | bottle-fed infants | 151                      | 6.94e-05                   | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved |
| Reference Dose (RfD) or Equivalent | 1.04167E-08 | mg/kg/day | FDA 2018; NIH 2018 | Allergan, Inc. 2017 | lowest therapeutic dose: synthetic estrogen for birth control | general population | 33.8                     | 0.000245                   | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                            | Value        | Units     | Source              | Notes |
|---------------------------------------------------------|--------------|-----------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |              |           |                     |       |
| Acute Health-Based Guidance Value                       | 0.0000005    | mg/L      | MN DOH              |       |
| Chronic Health-Based Guidance Value                     | 0.0000002    | mg/L      | MN DOH              |       |
| Maximum Recommended Daily Dose                          | 0.0005       | mg/kg/day | FDA                 |       |
| Screening level for pharmaceutical - general population | 0.000000245  | mg/L      | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 6.94E-08     | mg/L      | EPA Office of Water |       |
| Short-Term/Subchronic Health-Based Guidance Value       | 0.0000002    | mg/L      | MN DOH              |       |
| Cancer Classification (CC)                              | Female.Rats  | no units  | HHS NTP             |       |
| Cancer Classification (CC)                              | Male.Rats EE | no units  | HHS NTP             |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 1200  | mg/kg   | NIH HSDB                | min   |
| LD50                                             | 5000  | mg/kg   | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 28    | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value   | Units    | Source    | Notes |
|--------------------------|---------|----------|-----------|-------|
| <b>Modeled Data</b>      |         |          |           |       |
| LD50                     | 0.00798 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0       | no units | TEST QSAR |       |
| Developmental toxin test | 1       | no units | TEST QSAR |       |



Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

17-alpha-Ethinyl estradiol  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             |                               |                   | Prevalence         |                      |                         |                        | Magnitude                 |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 | 1,201                         | 4                 | Sites              | 0.33                 | 0.0011                  | 0.0012                 | 0.00145                   | 0.00156                 | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             |                               |                   | Prevalence         |                      |                         |                        | Magnitude                 |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 581                           | 2                 | Sites              | 0.34                 | 0.00066                 | 0.000705               | 0.000732                  | 0.00075                 | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 33                            | 1                 | Sites              | 3.03                 | 0.00075                 | 0.00075                | 0.00075                   | 0.00075                 | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 548                           | 1                 | Sites              | 0.18                 | 0.00066                 | 0.00066                | 0.00066                   | 0.00066                 | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                             | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                      |             |                               |                   | Prevalence          |                      |                         |                        | Magnitude                 |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                       | 2006 - 2020 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Furlong et al 2017 (Finished) [83]                                   | 2007 - 2012 | NA                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Glassmeyer et al 2017 (Finished) [86]                                | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                        | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                 |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                      |             |                               |                   | Prevalence          |                      |                         |                        | Magnitude                 |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                         | 2006 - 2020 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)        | 2008 - 2017 | 255                           | 5                 | Sites               | 1.96                 | 0.00056                 | 0.00121                | 0.00164                   | 0.0017                  | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)          | 2008 - 2017 | 353                           | 1                 | Sites               | 0.28                 | 0.00647                 | 0.00647                | 0.00647                   | 0.00647                 | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)            | 2008 - 2017 | 608                           | 6                 | Sites               | 0.99                 | 0.00056                 | 0.00139                | 0.00361                   | 0.00647                 | ug/L        |       |
| Furlong et al 2017 (Ambient) [83]                                    | 2007 - 2012 | NA                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                                 | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                   | 2012 - 2014 | 38                            | 1                 | Sites               | 2.63                 | 0.000884                | 0.000884               | 0.000884                  | 0.000884                | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                              | 2013 - 2015 | 1,091                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                         | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Benotti et al. (2009) via Kostich et al. 2010 (Ambient) [127]        | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.0014                  | ug/L        |       |
| Huang et al. (2001) via Kostich et al. 2010 (Ambient) [127]          | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 7e-05                   | ug/L        |       |
| Kolpin et al. (2002) via Kostich et al. 2010 (Ambient) [127]         | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.273                   | ug/L        |       |
| Zuo et al. (2006) via Kostich et al. 2010 (Ambient) [127]            | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.0047                  | ug/L        |       |
| <b>Waste Water Effluent</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                      |             |                               |                   | Prevalence          |                      |                         |                        | Magnitude                 |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                                 | 2011 - 2017 | 21                            | 5                 | Sites               | 24                   | 0.00053                 | 0.00145                | 0.0018                    | 0.00182                 | ug/L        |       |
| Auriol et al. (2008) via Kostich et al. 2010 (Wastewater) [127]      | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.006                   | ug/L        |       |
| Chimchirian et al. (2007) via Kostich et al. 2010 (Wastewater) [127] | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.0012                  | ug/L        |       |
| Huang et al. (2001) via Kostich et al. 2010 (Wastewater) [127]       | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.0024                  | ug/L        |       |
| <b>Estimated Concentration in Water</b>                              | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                      |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                   |      | 3.38E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value     | Units                   | Notes |
|-------------------------------------------------------------------|------------|-----------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 58.463    | days                    |       |
| Boiling point                                                     | OPERA QSAR | 390.506   | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 383.097   | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 7.41E-10  | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 1.27E-08  | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0000399 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0000126 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 120.559   | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  |           |                         |       |
| Henry's Law constant                                              | OPERA QSAR | 9.14E-08  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 3.66688   | no units                |       |

**17-alpha-Ethynyl estradiol**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                  |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. <i>Environmental Science and Technology</i> 53: 2950-2960.                                                            |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                                  |
| 83               | Furlong, E.T., Batt, A.L., Glassmeyer, S.T., Noriega, M.C., Kolpin, D.W., Mash, H., Schenck, K.M. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States: Pharmaceuticals. <i>Science of The Total Environment</i> . 579 (1629-1642). |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922).         |
| 127              | Kostich, MS, et al., 2010. Predicting variability of aquatic concentrations of human pharmaceuticals. <i>Sci. Total Environ</i> . 408 (20), 4504e4510.                                                                                                                                                          |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                                             |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                              |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                |

**17-beta-Estradiol**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                        |                               |
|------------------------|-------------------------------|
| <b>Name:</b>           | 17-beta-Estradiol             |
| <b>CASRN:</b>          | 50-28-2                       |
| <b>DTXSID:</b>         | <a href="#">DTXSID0020573</a> |
| <b>Use:</b>            | Pharmaceutical, hormone       |
| <b>Chemical Notes:</b> |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                                 |                                   |
|---------------------------------|-----------------------------------|
| <b>Draft CCL5 List Decision</b> | <b>Final Hazard Quotient (HQ)</b> |
| Not List                        | 0.030                             |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 9       | non-cancer effects | 3          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                           | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 0.03                   | lowest therapeutic dose: hormone therapy; hypoestrogenism, treatment of vasomotor symptoms associated with menopause, etc | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.000886                     | 90th Percentile                               | Finished Water                       | UCMR3  | 2013-2015 |

**PUBLIC NOMINATION STATUS**

|                          |
|--------------------------|
| <b>Public Nomination</b> |
|                          |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |
| Not Applicable |                |                |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## 17-beta-Estradiol

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value       | Units          | Assessment Source  | Critical Study      | Critical Effect                                                                                                 | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                 |
|------------------------------------|-------------|----------------|--------------------|---------------------|-----------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 4.16667E-06 | mg/kg-day      | FDA 2018; NIH 2018 | Epic Pharma, LLC    | lowest therapeutic dose: hormone therapy, treatment of symptoms associated with menopause, hypoestrogenism, etc | bottle-fed infants | 151                         | 0.03                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 4.16667E-06 | mg/kg-day      | FDA 2018; NIH 2018 | Epic Pharma, LLC    | lowest therapeutic dose: hormone therapy, treatment of symptoms associated with menopause, hypoestrogenism, etc | general population | 33.8                        | 0.1                        | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Cancer Slope Factor (CSF)          | 39          | (mg/kg/day)^-1 | CALEPA 1992        | Highman et al. 1980 | mammary gland adenocarcinomas                                                                                   | general population | 33.8                        | 0.0007                     | [55]                     |                                                                                                                       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                            | Value     | Units          | Source                         | Notes |
|---------------------------------------------------------|-----------|----------------|--------------------------------|-------|
| <b>Measured Data and Assessment Results</b>             |           |                |                                |       |
| Cancer Slope Factor (CSF)                               | 39        | (mg/kg/day)^-1 | CalEPA OEHHA Chemical Database |       |
| Inhalation Unit Risk (IUR)                              | 0.011     | ug/m^3         | CalEPA OEHHA Chemical Database |       |
| Maximum Recommended Daily Dose                          | 0.5       | mg/kg/day      | FDA                            |       |
| Screening level for pharmaceutical - general population | 0.000098  | mg/L           | EPA Office of Water            |       |
| Screening level for pharmaceutical - infants            | 0.0000278 | mg/L           | EPA Office of Water            |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| Percent of active toxcast in vitro assays tested | 22.84 | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0057943 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.33      | no units | TEST QSAR |       |
| Developmental toxin test | 0.889     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

17-beta-Estradiol  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 | 1,201                         | 2                 | Sites              | 0.17                 | 4.00E - 04              | 0.00076                | 0.000886                  | 0.00091                 | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 580                           | 2                 | Sites              | 0.34                 | 0.00048                 | 0.00051                | 0.000528                  | 0.00054                 | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 32                            | 2                 | Sites              | 6.25                 | 0.00048                 | 0.00051                | 0.000528                  | 0.00054                 | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 548                           | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 255                           | 14                | Sites               | 5.49                 | 9.00E - 05              | 0.00094                | 0.00242                   | 0.00388                 | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 382                           | 4                 | Sites               | 1.05                 | 0.00179                 | 0.00439                | 0.0063                    | 0.0065                  | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 637                           | 18                | Sites               | 2.83                 | 9.00E - 05              | 0.00148                | 0.0043                    | 0.0065                  | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                            | 5                 | Sites               | 13                   | 0.000325                | 0.000616               | 0.00202                   | 0.002354                | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                            | 3                 | Sites               | 7.89                 | 0.00071                 | 0.00086                | 0.00153                   | 0.0017                  | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                       | 2013 - 2015 | 1,091                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                            | 5                 | Sites               | 24                   | 0.000707                | 0.00119                | 0.0088                    | 0.008934                | ug/L        |       |
| Estimated Concentration in Water                              | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.000000032                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|----------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 58.4157    | days                    |       |
| Boiling point                                                  | OPERA QSAR | 372.709    | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 378.806    | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 3.41E-10   | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 2.03E-08   | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0000158  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.000047   | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 33.8438    | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 160.694    | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.00000853 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.90759    | no units                |       |

**17-beta-Estradiol**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                          |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. <i>Environmental Science and Technology</i> 53: 2950-2960.                                                    |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.        |
| 55               | CalEPA. 1992. Expedited Cancer Potency Values and Proposed Regulatory Levels for Certain Proposition 65 Carcinogens. California Environmental Protection Agency (CalEPA), Office of Environmental Health Hazard Assessment, Reproductive and Cancer Hazard Assessment Section, Sacramento, CA.          |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                          |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922). |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                                     |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                      |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.        |

**2-(2-Methyl-4-chlorophenoxy)propionic acid (MCPP)**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                        |                                                   |
|------------------------|---------------------------------------------------|
| <b>Name:</b>           | 2-(2-Methyl-4-chlorophenoxy)propionic acid (MCPP) |
| <b>CASRN:</b>          | 93-65-2                                           |
| <b>DTXSID:</b>         | <a href="#">DTXSID9024194</a>                     |
| <b>Use:</b>            | Herbicide                                         |
| <b>Chemical Notes:</b> |                                                   |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                                 |                                   |
|---------------------------------|-----------------------------------|
| <b>Draft CCL5 List Decision</b> | <b>Final Hazard Quotient (HQ)</b> |
| Not List                        | 0.04                              |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 2          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                  | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 200                    | increased kidney weights and chronic nephropathy | general population | OPP               | 2019                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|------|
| 8                            |                                               | EDWC SW 30-Year Mean                 | OPP    | 2019 |

**PUBLIC NOMINATION STATUS**

|                          |
|--------------------------|
| <b>Public Nomination</b> |
|                          |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**2-(2-Methyl-4-chlorophenoxy)propionic acid (MCPP)**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units     | Assessment Source | Critical Study            | Critical Effect                                  | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|---------------------------|--------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.04  | mg/kg/day | OPP 2019          | Mellert et al. 1996, 1999 | increased kidney weights and chronic nephropathy | general population | 33.8                        | 237        | [419]                    |       |
| Cancer Classification (CC)         | 5     |           | OPP 2019          |                           |                                                  |                    |                             |            | [419]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                | Value | Units | Source                                | Notes |
|---------------------------------------------|-------|-------|---------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |                                       |       |
| Drinking Water Guideline Value              | 0.01  | mg/L  | WHO Drinking Water Quality Guidelines |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 1210  | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 369   | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 125   | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 50    | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 10    | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 50    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 1.16  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 9     | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 3     | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0039355 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.046     | no units | TEST QSAR |       |
| Developmental toxin test | 0.691     | no units | TEST QSAR |       |



## 2-(2-Methyl-4-chlorophenoxy)propionic acid (MCPPE)

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 2                | 2,823                     | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 6                | 254                        | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects                       | Minimum Conc. (Detects)                                                                                                                                                                                                                                                                      | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                                            |                                                                                                                                                                                                                                                                                              |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 12                            | 6                 | Sites               | 50                                         | 0.00052                                                                                                                                                                                                                                                                                      | 0.0012                 | 0.00443                   | 0.19                    | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                                            |                                                                                                                                                                                                                                                                                              |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 27                | Sites               | 12                                         | 0.00052                                                                                                                                                                                                                                                                                      | 0.0014                 | 0.014                     | 0.16                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 218                           | 21                | Sites               | 9.63                                       | 0.00052                                                                                                                                                                                                                                                                                      | 0.0027                 | 0.0708                    | 0.139                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 6                 | Sites               | 50                                         | 0.00052                                                                                                                                                                                                                                                                                      | 0.0013                 | 0.012                     | 0.16                    | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 107                           | 0                 | Sites               | 0                                          |                                                                                                                                                                                                                                                                                              |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                                            |                                                                                                                                                                                                                                                                                              |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                                      | Notes                                                                                                                                                                                                                                                                                        |                        |                           |                         |             |       |
| Estimated Drinking Water Concentration (EDWC) in Surface Water, 30-Year Mean           | 2019        | OPP                           | 8                 | ug/L                | Pesticide in Water Calculator (PWC), v1.52 | The modeled surface water 30-year mean concentration provided by the most recent available EPA OPP health assessment was selected as the occurrence concentration for MCPPE. This value coincides with the critical effect of chronic nephropathy provided within the health effects report. |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 7.16E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|----------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.5293     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 296.689    | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 312.482    | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00000159 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.0000131  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00184223 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00348337 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 3.69239    | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 5.52077    | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 1.62E-09   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.05172    | no units                |       |

**2-(2-Methyl-4-chlorophenoxy)propionic acid (MCP)**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                  |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 419              | USEPA. 2019. Mecoprop-p (MCP-p): Acute, and Chronic Aggregate Dietary (Drinking Water Only) Exposure and Risk Assessments for the Registration Review Risk Assessment. EPA-HQ-OPP-2014-0361-0021. DP No. D452571. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.    |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society. |

## 2,4-DB

CCL 5 Contaminant Information Sheet

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                               |
|-----------------|-------------------------------|
| Name:           | 2,4-DB                        |
| CASRN:          | 94-82-6                       |
| DTXSID:         | <a href="#">DTXSID7024035</a> |
| Use:            | Post-emergent herbicide       |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.40                       |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 4       | reproductive and developmental effects | 10         | 7         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                                     | Target Pop.               | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------|----------------------|
| HRL                                                      | 800                    | increased early resorptions; decreased body weight, increased kidney weight, increased incidence of tubular degeneration in females | women of childbearing age | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|------|
| 318.68                       |                                               | EDWC SW (acute)                      | OPP    | 2018 |

## PUBLIC NOMINATION STATUS

|                   |
|-------------------|
| Public Nomination |
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## 2,4-DB

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study      | Critical Effect                                                                                                                     | Target Population         | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.15  | mg/kg/day | OPP 2018          | Henwood 1990a and b | increased early resorptions; decreased body weight, increased kidney weight, increased incidence of tubular degeneration in females | women of childbearing age | 35.4                        | 847        | [393]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2018          |                     |                                                                                                                                     |                           |                             |            | [393]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 20    | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.6   | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.2   | mg/L      | EPA HHBP                                |       |
| Drinking Water Guideline Value              | 0.09  | mg/L      | WHO Drinking Water Quality Guidelines   |       |
| Health-Based Screening Level                | 0.2   | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.03  | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units     | Source                          | Notes |
|---------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                 |       |
| LD50                                        | 400   | mg/kg     | NIH HSDB                        | min   |
| LD50                                        | 700   | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                       | 125   | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                       | 30    | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                       | 3     | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                       | 62.5  | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in                | 2.6   | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                            | 25    | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                            | 50    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                            | 15.8  | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                            | 4.96  | mg/kg/day | EPA Toxicity Reference Database | min   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0027227 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.07      | no units | TEST QSAR |       |
| Developmental toxin test | 0.701     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

2,4-DB

CCL 5 Contaminant Information Sheet

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**OCCURRENCE DATA**

**Scoring Data**

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             |                               | Prevalence        |                    |                      |                         |                        | Magnitude                 |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             |                               | Prevalence        |                    |                      |                         |                        | Magnitude                 |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 46               | 1,445,891                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

**Non-Scoring Data**

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects                                                                        | Minimum Conc. (Detects)                                                                                                                                                                                                                                                                                                                                           | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                                                                                             |                                                                                                                                                                                                                                                                                                                                                                   |                        |                           |                         |             |       |
|                                                                                        |             |                               | Prevalence        |                     |                                                                                             |                                                                                                                                                                                                                                                                                                                                                                   |                        | Magnitude                 |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 60                            | 0                 | Sites               | 0                                                                                           |                                                                                                                                                                                                                                                                                                                                                                   |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 12                            | 1                 | Sites               | 8.33                                                                                        | 0.023                                                                                                                                                                                                                                                                                                                                                             | 0.023                  | 0.023                     | 0.023                   | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                                                                                             |                                                                                                                                                                                                                                                                                                                                                                   |                        |                           |                         |             |       |
|                                                                                        |             |                               | Prevalence        |                     |                                                                                             |                                                                                                                                                                                                                                                                                                                                                                   |                        | Magnitude                 |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 620                           | 1                 | Sites               | 0.16                                                                                        | 6.2                                                                                                                                                                                                                                                                                                                                                               | 6.2                    | 6.2                       | 6.2                     | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 206                           | 3                 | Sites               | 1.46                                                                                        | 0.01                                                                                                                                                                                                                                                                                                                                                              | 0.03                   | 0.1                       | 0.13                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 554                           | 0                 | Sites               | 0                                                                                           |                                                                                                                                                                                                                                                                                                                                                                   |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 760                           | 3                 | Sites               | 0.39                                                                                        | 0.01                                                                                                                                                                                                                                                                                                                                                              | 0.03                   | 0.1                       | 0.13                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 0                 | Sites               | 0                                                                                           |                                                                                                                                                                                                                                                                                                                                                                   |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 0                 | Sites               | 0                                                                                           |                                                                                                                                                                                                                                                                                                                                                                   |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 0                 | Sites               | 0                                                                                           |                                                                                                                                                                                                                                                                                                                                                                   |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 212                           | 4                 | Sites               | 1.89                                                                                        | 0.22                                                                                                                                                                                                                                                                                                                                                              | 0.57                   | 0.948                     | 1.08                    | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 2                 | Sites               | 5.26                                                                                        | 0.0281                                                                                                                                                                                                                                                                                                                                                            | 0.0768                 | 0.116                     | 0.1255                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 106                           | 0                 | Sites               | 0                                                                                           |                                                                                                                                                                                                                                                                                                                                                                   |                        |                           |                         |             |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                                     | 2002 - 2010 | 125                           | 14                | Samples             | 11                                                                                          |                                                                                                                                                                                                                                                                                                                                                                   |                        |                           | 0.1                     | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                                                                                             |                                                                                                                                                                                                                                                                                                                                                                   |                        |                           |                         |             |       |
|                                                                                        |             |                               | Prevalence        |                     |                                                                                             |                                                                                                                                                                                                                                                                                                                                                                   |                        | Magnitude                 |                         |             |       |
|                                                                                        |             |                               |                   |                     |                                                                                             |                                                                                                                                                                                                                                                                                                                                                                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                                                                                             |                                                                                                                                                                                                                                                                                                                                                                   |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>                                                                                | <b>Notes</b>                                                                                                                                                                                                                                                                                                                                                      |                        |                           |                         |             |       |
| Estimated Drinking Water Concentration (EDWC) in Surface Water (acute)                 | 2018        | OPP                           | 318.68            | ug/L                | Pesticide Root Zone Model (PRZM) v3.12, Exposure Analysis Modeling System (EXAMS), v2.98.04 | The critical effect of increased early resorptions is considered a less-than-chronic response seen during gestation. To be protective of pregnant women and fetuses, the modeled surface water acute concentration found in the most recent available EPA OPP health assessment was selected as the occurrence concentration for 2,4-dichlorophenoxybutyric acid. |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 9.69E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.53603     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 320.542     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 321.218     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000000498 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000011    | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000375647 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00034435  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 3.46701     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 15.5597     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 1.43E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.38207     | no units                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

**2,4-DB**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 393              | USEPA. 2018. 2,4-DB: Draft Human Health Risk Assessment in Support of Registration Review. EPA-HQ-OPP-2013-0661-0019. DP No. D448826. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                   |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**2,4-Dichlorophenol**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                   |
|-----------------|---------------------------------------------------|
| Name:           | 2,4-Dichlorophenol                                |
| CASRN:          | 120-83-2                                          |
| DTXSID:         | <a href="#">DTXSID1020439</a>                     |
| Use:            | Biocide; intermediate in production of herbicides |
| Chemical Notes: |                                                   |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.25                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                             | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 20                     | decreased delayed hypersensitivity response | general population | IRIS              | 1987                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 5                            | 90th Percentile                               | All Ambient Water                    | NWIS   | 2008-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|-------------------|

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**2,4-Dichlorophenol**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units     | Assessment Source | Critical Study         | Critical Effect                             | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|------------------------|---------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.1   | mg/kg/day | HC 1987           | Kobayashi et al., 1972 | changes in liver histopathology             | general population | 33.8                        | 592        | [98]                     |       |
| Reference Dose (RfD) or Equivalent | 0.003 | mg/kg/day | IRIS 1987         | Exon and Koller 1985   | decreased delayed hypersensitivity response | general population | 33.8                        | 17.8       | [189]                    |       |
| Cancer Classification (CC)         | NL    |           | PPRTV 2007        |                        |                                             |                    |                             |            | [280]                    |       |
|                                    |       |           | ATSDR 1999        |                        |                                             |                    |                             |            | [14]                     |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References Identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     | 2006-07-01           | 2020-03-25         | 630                                            | 1                                               | 23                                             | 0                                                 |

**Other Health Data**

| Data Element                                | Value          | Units     | Source                             | Notes |
|---------------------------------------------|----------------|-----------|------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |                |           |                                    |       |
| 10-day Health Advisory                      | 0.03           | mg/L      | EPA DWSHA 2018                     |       |
| Chronic Health-Based Guidance Value         | 0.02           | mg/L      | MN DOH                             |       |
| Human Health Ambient Water Quality Criteria | 0.01           | mg/L      | EPA Human Health Criteria for CWA  |       |
| Intermediate Minimal Risk Level (MRL)       | 0.003          | mg/kg/day | CDC ATSDR                          |       |
| Lifetime Health Advisory                    | 0.02           | mg/L      | EPA DWSHA 2018                     |       |
| Maximum Allowable Concentration (MAC)       | 0.9            | mg/L      | Canadian Drinking Water Guidelines |       |
| Subchronic Provisional RfD                  | 0.02           | mg/kg/day | EPA PPRTV                          |       |
| Cancer Classification (CC)                  | Female.Mice NE | no units  | HHS NTP                            |       |
| Cancer Classification (CC)                  | Female.Rats NE | no units  | HHS NTP                            |       |
| Cancer Classification (CC)                  | Male.Mice NE   | no units  | HHS NTP                            |       |
| Cancer Classification (CC)                  | Male.Rats NE   | no units  | HHS NTP                            |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value  | Units     | Source                          | Notes |
|--------------------------------------------------|--------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |        |           |                                 |       |
| LD50                                             | 2050   | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 500    | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 543    | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 768    | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 194    | mg/kg/day | EPA Toxicity Reference Database |       |
| Percent of active toxcast in vitro assays tested | 3.99   | percent   | EPA Chemistry Dashboard         |       |
| TD50                                             | 12400  | mg/kg/day | NIH CPDB                        | min   |
| TD50                                             | 458000 | mg/kg/day | NIH CPDB                        | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0039355 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.015     | no units | TEST QSAR |       |
| Developmental toxin test | 0.176     | no units | TEST QSAR |       |



Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

2,4-Dichlorophenol  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 | 294                           | 0                 | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 22                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 13                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) | 5                | 34,293                     | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 6                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 36                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 148                           | 25                | Sites               | 17                   | 0.01                    | 0.03                   | 5                         | 5                       | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 392                           | 8                 | Sites               | 2.04                 | 0.01                    | 0.02                   | 1.88                      | 18                      | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 540                           | 33                | Sites               | 6.11                 | 0.01                    | 0.03                   | 5                         | 18                      | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| ExpoCast exposure                               |      | 0.00000499                              |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) | 3                            | ug/l  |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|----------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.02586    | days                    |       |
| Boiling point                                                  | OPERA QSAR | 211.815    | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 237.218    | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.0785496  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.0280543  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0237665  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00864968 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 18.2343    | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 57.4116    | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.00000133 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.04309    | no units                |       |

**2,4-Dichlorophenol**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                         |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 14               | ATSDR. 1999. Toxicological Profile for Chlorophenols. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                      |
| 98               | Health Canada. 1987. Guideline Technical Document - Chlorophenols. Health Canada (HC), Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Ottawa, Ontario, Canada.                                                                         |
| 189              | USEPA. 1987. Chemical Assessment Summary, 2,4-Dichlorophenol. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, D.C.                                                          |
| 280              | USEPA. 2007. Provisional Peer-Reviewed Toxicity Values for 2,4-Dichlorophenol. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH. |

**2,4-Dinitrophenol**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | 2,4-Dinitrophenol             |
| CASRN:          | 51-28-5                       |
| DTXSID:         | <a href="#">DTXSID0020523</a> |
| Use:            |                               |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 2.6                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                                                                                         | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 10                     | lowest therapeutic dose in humans taking 2,4 dinitrophenol; cataracts were observed in patients receiving as little as 2 mg/kg/day, the lower range of the recommended therapeutic dose | general population | IRIS              | 2005                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 26.3                         | 90th Percentile                               | All Ambient Water                    | NWIS   | 2008-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**2,4-Dinitrophenol**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                                                                                                                                                                         | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                                                                                                |
|------------------------------------|-------|-----------|-------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.002 | mg/kg/day | IRIS 2005         | Horner, 1942   | lowest therapeutic dose in humans taking 2,4 dinitrophenol; cataracts were observed in patients receiving as little as 2 mg/kg/day, the lower range of the recommended therapeutic dose | general population | 33.8                        | 11.8       | [262]                    | NOTE: CCL screening level based on draft ATSDR (2019 assessment, based on 2008 study) is several orders of mag lower than HRL (based on 2006 assessment, 1942 study) |
| Cancer Classification (CC)         | I     |           | PPRTV 2007        |                |                                                                                                                                                                                         |                    |                             |            | [281]                    |                                                                                                                                                                      |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element                       | Value   | Units     | Assessment Source | Critical Study                | Critical Effect       | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|---------|-----------|-------------------|-------------------------------|-----------------------|--------------------|-----------------------------|----------------------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.00007 | mg/kg/day | ATSDR 2019        | Caldeira da Silva et al. 2008 | decreased body weight | bottle-fed infants | 151                         | 0.0900                     | [37]                     |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     | 2010-03-01           | 2020-04-14         | 326                                            | 1                                               | 3                                              | 0                                                 |

**Other Health Data**

| Data Element                                | Value | Units     | Source                            | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                   |       |
| Acute Minimal Risk Level (MRL)              | 0.01  | mg/kg/day | CDC ATSDR                         |       |
| Chronic Health-Based Guidance Value         | 0.01  | mg/L      | MN DOH                            |       |
| Human Health Ambient Water Quality Criteria | 0.01  | mg/L      | EPA Human Health Criteria for CWA |       |
| Human Health Ambient Water Quality Criteria | 0.01  | mg/L      | EPA Human Health Criteria for CWA |       |
| Subchronic Provisional RfD                  | 0.02  | mg/kg/day | EPA PPRTV                         |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 20    | mg/kg   | NIH HSDB                | min   |
| LD50                                             | 72    | mg/kg   | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 11.86 | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0002529 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.134     | no units | TEST QSAR |       |
| Developmental toxin test | 0.554     | no units | TEST QSAR |       |

## 2,4-Dinitrophenol

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 | 294                           | 0                 | Sites              | 0                    |                         |                        |                           |                         | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 22                            | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 13                            | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9                             | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) | 2                | 188,429                    | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 146                           | 3                 | Sites               | 2.05                 | 24                      | 25                     | 26.3                      | 27                      | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 358                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 504                           | 3                 | Sites               | 0.6                  | 24                      | 25                     | 26.3                      | 27                      | ug/L        |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 6.19E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.59079     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 349.689     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 325.528     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000270249 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.0000585   | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00173025  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0055847   | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 4.7119      | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 2.68534     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 9.77E-08    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 1.81096     | no units                |       |

**2,4-Dinitrophenol**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                         |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 37               | ATSDR. 2019. Toxicological Profile for Dinitrophenols DRAFT FOR PUBLIC COMMENT. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                            |
| 262              | USEPA. 2005. Chemical Assessment Summary 2,4-Dinitrophenol. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, DC.                                                             |
| 281              | USEPA. 2007. Provisional Peer-Reviewed Toxicity Values for 2,4-Dinitrotoluene. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH. |

**2,4-Dinitrotoluene**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                       |
|-----------------|---------------------------------------|
| Name:           | 2,4-Dinitrotoluene                    |
| CASRN:          | 121-14-2                              |
| DTXSID:         | <a href="#">DTXSID0020529</a>         |
| Use:            | Chemical intermediate; in propellants |
| Chemical Notes: |                                       |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 8300                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 5       | carcinogen with linear MOA | 1          | 10        |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                     | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.04                   | mammary gland tumors (adenomas, fibroadenomas, fibromas, adenocarcinomas/carcinomas) in female rats | general population | OW                | 2008                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date        |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-------------|
| 333                          | 90th Percentile                               | Finished Water                       | UCMR1  | 2001 - 2003 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2 | RD 3           |
|----------------|------|----------------|
| Not Applicable | X    | Not Applicable |

**Basis**

2,4-DNT appears to occur infrequently at levels of concern in PWSS. 2,4-DNT was detected only once at a minimum reporting level (MRL) of 2 µg/L in any of the PWSSs monitored under the UCMR 1 [a]. While the MRL is slightly greater than the HRL of 0.05 µg/L, this concentration is within the acceptable 10-4 to the 10-6 cancer risk range targeted by EPA [b].

[a] USEPA, 2008 [297]; [b] USEPA, 2000 [238]; as cited in USEPA, 2008 [296]

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**2,4-Dinitrotoluene**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units          | Assessment Source | Critical Study                        | Critical Effect                                                                                     | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|----------------|-------------------|---------------------------------------|-----------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.001 | mg/kg/day      | ATSDR 2016        | U.S. Army. 1979; Ellis et al. 1985    | "hematological effects (decreased erythrocyte count)"                                               | general population | 33.8                        | 5.92       | [34]                     |       |
| Reference Dose (RfD) or Equivalent | 0.002 | mg/kg/day      | OW 2008           | Ellis et al., 1979; Ellis et al. 1985 | "neurotoxicity and the presence of Heinz bodies and biliary tract hyperplasia"                      | general population | 33.8                        | 11.8       | [288]                    |       |
| Reference Dose (RfD) or Equivalent | 0.002 | mg/kg/day      | IRIS 1992         | Ellis et al. 1985                     | "Neurotoxicity, Heinz bodies and biliary tract hyperplasia"                                         | general population | 33.8                        | 11.8       | [214]                    |       |
| Cancer Slope Factor (CSF)          | 0.667 | (mg/kg/day)^-1 | OW 2008           | Ellis et al. 1979                     | mammary gland tumors (adenomas, fibroadenomas, fibromas, adenocarcinomas/carcinomas) in female rats | general population | 33.8                        | 0.0444     | [288]                    |       |
| Cancer Classification (CC)         | L     |                | OW 2008           |                                       |                                                                                                     |                    |                             |            | [288]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Hepatic, Systemic           | 50                          | Maeda, 2015        | Gastrointestinal             | 100                          | Maeda, 2015         | 2015-02-01           | 2019-12-17         | 65                                             | 1                                               | 0                                              | 1                                                 |

**Other Health Data**

| Data Element                                | Value         | Units          | Source                            | Notes |
|---------------------------------------------|---------------|----------------|-----------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |               |                |                                   |       |
| 10-day Health Advisory                      | 1             | mg/L           | EPA DWSHA 2018                    |       |
| Acute Minimal Risk Level (MRL)              | 0.05          | mg/kg/day      | CDC ATSDR                         |       |
| Cancer Slope Factor (CSF)                   | 0.31          | (mg/kg/day)^-1 | CalEPA OEHHA Chemical Database    |       |
| Human Health Ambient Water Quality Criteria | 0.000049      | mg/L           | EPA Human Health Criteria for CWA |       |
| Inhalation Unit Risk (IUR)                  | 0.000089      | ug/m^3         | CalEPA OEHHA Chemical Database    |       |
| Intermediate Minimal Risk Level (MRL)       | 0.007         | mg/kg/day      | CDC ATSDR                         |       |
| Lifetime Health Advisory                    | 0.00005       | mg/L           | EPA DWSHA 2018                    |       |
| Cancer Classification (CC)                  | 2B            | no units       | WHO IARC                          |       |
| Cancer Classification (CC)                  | Female.Mice N | no units       | HHS NTP                           |       |
| Cancer Classification (CC)                  | Female.Rats P | no units       | HHS NTP                           |       |
| Cancer Classification (CC)                  | Male.Mice N   | no units       | HHS NTP                           |       |
| Cancer Classification (CC)                  | Male.Rats P   | no units       | HHS NTP                           |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                  | Notes |
|--------------------------------------------------|-------|-----------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                         |       |
| LD50                                             | 1954  | mg/kg     | NIH HSDB                | max   |
| LD50                                             | 268   | mg/kg     | NIH HSDB                | min   |
| Percent of active toxcast in vitro assays tested | 2.69  | percent   | EPA Chemistry Dashboard |       |
| TD50                                             | 68    | mg/kg/day | NIH CPDB                | max   |
| TD50                                             | 9.35  | mg/kg/day | NIH CPDB                | min   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0019724 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.808     | no units | TEST QSAR |       |
| Developmental toxin test | 0.47      | no units | TEST QSAR |       |



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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 | 3,873                               | 1                    | Sites                 | 0.03                    | 333                        | 333                       | 333                          | 333                        | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 22                                  | 0                    | Sites                 | 0                       |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 13                                  | 0                    | Sites                 | 0                       |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9                                   | 0                    | Sites                 | 0                       |                            |                           |                              |                            |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) | 6                   | 10,733                        | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) | 25K - 100K                   |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 54                                  | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 265                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 160                                 | 3                    | Sites                  | 1.88                    | 4.9                        | 5                         | 5                            | 5                          | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 410                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 567                                 | 3                    | Sites                  | 0.53                    | 4.9                        | 5                         | 5                            | 5                          | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water                              | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expcast exposure                                   |      | 3.63E-08                                      |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.55991     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 297.386     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 304.767     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.000217133 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.000676083 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.00127277  | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000635331 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 9.38408     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 7.7983      | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 7.58E-08    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 1.93488     | no units                |       |

**2,4-Dinitrotoluene**

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| Reference Number | Full Reference                                                                                                                                                                                                                               |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 34               | ATSDR. 2016. Toxicological Profile for Dinitrotoluenes. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                          |
| 214              | USEPA. 1992. Chemical Assessment Summary 2,4-Dinitrotoluene. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, DC.                                  |
| 238              | USEPA. 2000. Unregulated Contaminant Monitoring Regulation Analytical Methods and Quality Control Manual. EPA 815-R-00-006.                                                                                                                  |
| 288              | USEPA. 2008. Drinking Water Health Advisory for 2,4-Dinitrotoluene and 2,6-Dinitrotoluene. EPA/822/R-08/010. U.S. Environmental Protection Agency, Office of Water, Health and Ecological Criteria Division, Washington, DC.                 |
| 296              | USEPA. 2008. Regulatory Determinations Support Document for Selected Contaminants from the Second Drinking Water Contaminant Candidate List (CCL 2). EPA Report 815-R-08-012. June 2008.                                                     |
| 297              | USEPA. 2008. The Analysis of Occurrence Data from the First Unregulated Contaminant Monitoring Regulation (UCMR 1) in Support of Regulatory Determinations for the Second Drinking Water Contaminant Candidate List. EPA 815-R-08-013. June. |

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Name:           | 2,6-Dinitrotoluene                                                                      |
| CASRN:          | 606-20-2                                                                                |
| DTXSID:         | <a href="#">DTXSID5020528</a>                                                           |
| Use:            | Chemical intermediate in the manufacture of dyes and military and commercial explosives |
| Chemical Notes: |                                                                                         |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 250                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 6       | carcinogen with linear MOA | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect           | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.02                   | hepatocellular carcinomas | general population | PPRTV             | 2013                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 5                            | 90th Percentile                               | All Ambient Water                    | NWIS   | 2008-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2 | RD 3           |
|----------------|------|----------------|
| Not Applicable | X    | Not Applicable |

**Basis**

2,6-DNT appears to occur infrequently at levels of concern in PWSs. 2,6-DNT was not detected at a minimum reporting level (MRL) of 2 µg/L in any of the PWSs monitored under the UCMR 1 [a]. While the MRL is slightly greater than the HRL of 0.05 µg/L, this concentration is within the acceptable 10-4 to the 10-6 cancer risk range targeted by EPA [b].

[a] USEPA, 2008 [297]; [b] USEPA, 2000 [238]; as cited in USEPA, 2008 [296]

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**2,6-Dinitrotoluene**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value  | Units                     | Assessment Source | Critical Study                     | Critical Effect                                                                                                                   | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|---------------------------|-------------------|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0003 | mg/kg/day                 | PPRTV 2013        | Lee et al. 1976                    | Increased incidence of splenic extramedullary hematopoiesis                                                                       | general population | 33.8                        | 1.78       | [330]                    |       |
| Reference Dose (RfD) or Equivalent | 0.001  | mg/kg/day                 | OW 2008           | Lee et al. 1976                    | neurotoxicity, Heinz bodies, bile duct hyperplasia, liver and kidney histopathology, increased incidence of death                 | general population | 33.8                        | 5.92       | [289]                    |       |
| Cancer Slope Factor (CSF)          | 0.68   | (mg/kg/day) <sup>-1</sup> | IRIS 1990         | Ellis et al. 1979                  | hepatocellular carcinomas and neoplastic nodules; mammary gland adenomas, fibroadenomas, fibromas, and adenocarcinomas/carcinomas | general population | 33.8                        | 0.0435     | [206]                    |       |
| Cancer Slope Factor (CSF)          | 1.5    | (mg/kg/day) <sup>-1</sup> | PPRTV 2013        | Leonard et al. 1987                | hepatocellular carcinomas                                                                                                         | general population | 33.8                        | 0.0197     | [330]                    |       |
| Cancer Slope Factor (CSF)          | 0.667  | (mg/kg/day) <sup>-1</sup> | OW 2008           | Ellis et al. 1979; Lee et al. 1985 | hepatocellular carcinomas and neoplastic nodules; mammary gland adenomas, fibroadenomas, fibromas, and adenocarcinomas/carcinomas | general population | 33.8                        | 0.0444     | [289]                    |       |
| Cancer Classification (CC)         | B2     |                           | IRIS 1990         |                                    |                                                                                                                                   |                    |                             |            | [206]                    |       |
| Cancer Classification (CC)         | S      |                           | PPRTV 2013        |                                    |                                                                                                                                   |                    |                             |            | [330]                    |       |
| Cancer Classification (CC)         | L      |                           | OW 2008           |                                    |                                                                                                                                   |                    |                             |            | [289]                    |       |
|                                    |        |                           | ATSDR 2016        |                                    |                                                                                                                                   |                    |                             |            | [34]                     |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Hepatic, Systemic           | 20                          | Imamura, 2015      |                              |                              |                     | 2015-02-01           | 2020-02-13         | 31                                             | 1                                               | 0                                              | 1                                                 |

**Other Health Data**

| Data Element                                | Value   | Units     | Source         | Notes |
|---------------------------------------------|---------|-----------|----------------|-------|
| <b>Measured Data and Assessment Results</b> |         |           |                |       |
| 10-day Health Advisory                      | 0.04    | mg/L      | EPA DWSHA 2018 |       |
| Acute Minimal Risk Level (MRL)              | 0.09    | mg/kg/day | CDC ATSDR      |       |
| Intermediate Minimal Risk Level (MRL)       | 0.004   | mg/kg/day | CDC ATSDR      |       |
| Lifetime Health Advisory                    | 0.00005 | mg/L      | EPA DWSHA 2018 |       |
| Subchronic Provisional RfD                  | 0.003   | mg/kg/day | EPA PPRTV      |       |
| Cancer Classification (CC)                  | 2B      | no units  | WHO IARC       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 177   | mg/kg   | NIH HSDB                | min   |
| LD50                                             | 621   | mg/kg   | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 1.83  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0005861 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.613     | no units | TEST QSAR |       |
| Developmental toxin test | 0.44      | no units | TEST QSAR |       |

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Draft Fifth Contaminant Candidate List (CCL 5)  
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2,6-Dinitrotoluene

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**OCCURRENCE DATA**

**Scoring Data**

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 | 3,873                         | 0                 | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 22                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 13                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) | 3                | 2,728                      | Chemical Data Reporting (CDR) Results (EPA) (2016) | < 25K                        |

**Non-Scoring Data**

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 37                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 157                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 160                           | 5                 | Sites               | 3.12                 | 0.1                     | 5                      | 5                         | 5                       | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 410                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 567                           | 5                 | Sites               | 0.88                 | 0.1                     | 5                      | 5                         | 5                       | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                              | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 0.000000129                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.72441     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 297.597     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 303.476     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000411091 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000429536 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00117033  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00157761  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 12.4551     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 6.20869     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 9.26E-08    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.00324     | no units                |       |

**2,6-Dinitrotoluene**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                         |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 34               | ATSDR. 2016. Toxicological Profile for Dinitrotoluenes. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                    |
| 206              | USEPA. 1990. Chemical Assessment Summary, 2,4-/2,6-Dinitrotoluene mixture. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, D.C.                                             |
| 238              | USEPA. 2000. Unregulated Contaminant Monitoring Regulation Analytical Methods and Quality Control Manual. EPA 815-R-00-006.                                                                                                                                            |
| 289              | USEPA. 2008. Drinking Water Health Advisory for 2,4-Dinitrotoluene and 2,6-Dinitrotoluene. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Health and Ecological Criteria Division, Washington, D.C.                          |
| 296              | USEPA. 2008. Regulatory Determinations Support Document for Selected Contaminants from the Second Drinking Water Contaminant Candidate List (CCL 2). EPA Report 815-R-08-012. June 2008.                                                                               |
| 297              | USEPA. 2008. The Analysis of Occurrence Data from the First Unregulated Contaminant Monitoring Regulation (UCMR 1) in Support of Regulatory Determinations for the Second Drinking Water Contaminant Candidate List. EPA 815-R-08-013. June.                           |
| 330              | USEPA. 2013. Provisional Peer-Reviewed Toxicity Values for 2,6-Dinitrotoluene. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH. |

**2-Hydroxyatrazine**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | 2-Hydroxyatrazine             |
| CASRN:          | 2163-68-0                     |
| DTXSID:         | <a href="#">DTXSID6037807</a> |
| Use:            | Pesticide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.0005                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects | 10         | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                         | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 400                    | histopathological changes in the kidney | general population | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.2                          | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## 2-Hydroxyatrazine

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study     | Critical Effect                         | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|--------------------|-----------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0676 | mg/kg/day | OPP 2018          | Chow and Hart 1995 | histopathological changes in the kidney | general population | 33.8                        | 400        | [395]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Chronic Human Health Benchmark              | 0.06  | mg/L      | EPA HHBP                                |       |
| Drinking Water Guideline Value              | 0.2   | mg/L      | WHO Drinking Water Quality Guidelines   |       |
| Health-Based Screening Level                | 0.06  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.01  | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value     | Units     | Source                          | Notes |
|---------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |           |           |                                 |       |
| LOAEL                                       | 125       | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                       | 7.75      | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                       | 1.17      | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                       | 25        | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic LOAEL                            | 18.889999 | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                            | 59.599998 | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                            | 6.2       | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                            | 7.35      | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0091833 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.145     | no units | TEST QSAR |       |
| Developmental toxin test | 0.902     | no units | TEST QSAR |       |



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Draft Fifth Contaminant Candidate List (CCL 5)  
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CCL 5 Contaminant Information Sheet

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OCCURRENCE DATA

Scoring Data

| Nationally Representative Water Data                           | Date                    | Number of PWS/ Sites/ Samples    | Number of Detects | PWS/Sites/ Samples                                 | Percent with Detects    | Minimum Conc. (Detects)           | Median Conc. (Detects)                             | 90th Percentile (Detects)           | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------------------|----------------------------------|-------------------|----------------------------------------------------|-------------------------|-----------------------------------|----------------------------------------------------|-------------------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |                         |                                  |                   |                                                    |                         |                                   |                                                    |                                     |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019             |                                  |                   |                                                    |                         |                                   |                                                    |                                     |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015             |                                  |                   |                                                    |                         |                                   |                                                    |                                     |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010             |                                  |                   |                                                    |                         |                                   |                                                    |                                     |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003             |                                  |                   |                                                    |                         |                                   |                                                    |                                     |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997             |                                  |                   |                                                    |                         |                                   |                                                    |                                     |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992             |                                  |                   |                                                    |                         |                                   |                                                    |                                     |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986             |                                  |                   |                                                    |                         |                                   |                                                    |                                     |                         |             |       |
| <b>Ambient Water</b>                                           |                         |                                  |                   |                                                    |                         |                                   |                                                    |                                     |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017             | 4,188                            | 739               | Sites                                              | 18                      | 0.00044                           | 0.0402                                             | 0.2                                 | 7.29                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017             | 486                              | 345               | Sites                                              | 71                      | 0.00044                           | 0.042                                              | 0.2                                 | 4.6                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017             | 3,702                            | 394               | Sites                                              | 11                      | 0.00063                           | 0.018                                              | 0.123                               | 7.29                    | ug/L        |       |
| <b>Pesticide Application Data</b>                              | <b>Number of States</b> | <b>Amount Applied (lbs/year)</b> | <b>Date</b>       | <b>Toxic Release Data</b>                          | <b>Number of States</b> | <b>Amount Released (lbs/year)</b> | <b>Chemical Production Data</b>                    | <b>Production Volume (lbs/year)</b> |                         |             |       |
| Estimated Annual Agricultural Pesticide Use (USGS)             |                         |                                  |                   | Toxic Release Inventory (TRI) Program (EPA) (2016) |                         |                                   | Chemical Data Reporting (CDR) Results (EPA) (2016) |                                     |                         |             |       |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 10                            | 9                 | Sites               | 90                   | 0.002                   | 0.015                  | 0.12                      | 0.74                    | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 495                           | 303               | Sites               | 61                   | 0.00052                 | 0.028                  | 0.224                     | 3.27                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 1,249                         | 175               | Sites               | 14                   | 0.0013                  | 0.019                  | 0.0986                    | 0.822                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 1,744                         | 478               | Sites               | 27                   | 0.00052                 | 0.0258                 | 0.204                     | 3.27                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 227                           | 162               | Sites               | 71                   | 0.001998                | 0.023                  | 0.22                      | 1.2                     | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 218                           | 153               | Sites               | 70                   | 0.001998                | 0.0238                 | 0.0629                    | 0.255                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 10                            | 9                 | Sites               | 90                   | 0.002                   | 0.023                  | 0.26                      | 1.2                     | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 432                           | 55                | Sites               | 13                   | 0.007                   | 0.015                  | 0.282                     | 0.368                   | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 19                | Sites               | 50                   | 0.0055                  | 0.0344                 | 0.229                     | 0.5428                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 57                | Sites               | 8.26                 | 8e-04                   | 0.0103                 | 0.0514                    | 0.466                   | ug/L        |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                                     | 2002 - 2010 | 126                           | 11                | Samples             | 8.7                  |                         |                        |                           | 0.042                   | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      |                                         |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value     | Units                   | Notes |
|----------------------------------------------------------------|------------|-----------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.30198   | days                    |       |
| Boiling point                                                  | OPERA QSAR | 332.794   | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 326.232   | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 1.11E-10  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 8.95E-08  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0000634 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0101859 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 5.82054   | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 3.22107   | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 9.6E-09   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 1.95934   | no units                |       |

**2-Hydroxyatrazine**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 395              | USEPA. 2018. Atrazine. Draft Human Health Risk Assessment for Registration Review. EPQ-HQ-OPP-2013-0266-1159. DP No. D418316. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                           |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**2-Methyl-4-chlorophenoxyacetic acid (MCPA)**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                            |
|-----------------|--------------------------------------------|
| Name:           | 2-Methyl-4-chlorophenoxyacetic acid (MCPA) |
| CASRN:          | 94-74-6                                    |
| DTXSID:         | <a href="#">DTXSID4024195</a>              |
| Use:            | Herbicide                                  |
| Chemical Notes: |                                            |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.0013                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 8          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------|--------------------|-------------------|----------------------|
| HRL                                                      | 300                    | nephrotoxicity  | general population | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.3986                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**2-Methyl-4-chlorophenoxyacetic acid (MCPA)**

CCL 5 Contaminant Information Sheet

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|-----------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.044 | mg/kg/day | OPP 2018          | Kirsch, 1988   | nephrotoxicity  | general population | 33.8                        | 260        | [402]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2018          |                |                 |                    |                             |            | [402]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                | Value | Units | Source                             | Notes |
|---------------------------------------------|-------|-------|------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |                                    |       |
| 10-day Health Advisory                      | 0.1   | mg/L  | EPA DWSHA 2018                     |       |
| Chronic Health-Based Guidance Value         | 0.003 | mg/L  | MN DOH                             |       |
| Lifetime Health Advisory                    | 0.03  | mg/L  | EPA DWSHA 2018                     |       |
| Maximum Allowable Concentration (MAC)       | 0.1   | mg/L  | Canadian Drinking Water Guidelines |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 439   | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 800   | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 1.02  | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 120   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 0.21  | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 60    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 1.59  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 177   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic LOAEL                                 | 3     | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 1     | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 42    | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0032359 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.056     | no units | TEST QSAR |       |
| Developmental toxin test | 0.691     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

2-Methyl-4-chlorophenoxyacetic acid (MCPA)

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

OCCURRENCE DATA

Scoring Data

| Nationally Representative Water Data                           | Date                    | Number of PWS/ Sites/ Samples    | Number of Detects | PWS/Sites/ Samples                                 | Percent with Detects    | Minimum Conc. (Detects)           | Median Conc. (Detects)                             | 90th Percentile (Detects)           | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------------------|----------------------------------|-------------------|----------------------------------------------------|-------------------------|-----------------------------------|----------------------------------------------------|-------------------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |                         |                                  |                   |                                                    |                         |                                   |                                                    |                                     |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019             |                                  |                   |                                                    |                         |                                   |                                                    |                                     |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015             |                                  |                   |                                                    |                         |                                   |                                                    |                                     |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010             |                                  |                   |                                                    |                         |                                   |                                                    |                                     |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003             |                                  |                   |                                                    |                         |                                   |                                                    |                                     |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997             |                                  |                   |                                                    |                         |                                   |                                                    |                                     |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992             |                                  |                   |                                                    |                         |                                   |                                                    |                                     |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986             |                                  |                   |                                                    |                         |                                   |                                                    |                                     |                         |             |       |
| <b>Ambient Water</b>                                           |                         |                                  |                   |                                                    |                         |                                   |                                                    |                                     |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017             | 7,656                            | 142               | Sites                                              | 1.85                    | 0.01                              | 0.09                                               | 0.399                               | 18.6                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017             | 1,194                            | 136               | Sites                                              | 11                      | 0.01                              | 0.09                                               | 0.394                               | 18.6                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017             | 6,462                            | 6                 | Sites                                              | 0.09                    | 0.03                              | 0.169                                              | 8.8                                 | 16.6                    | ug/L        |       |
| <b>Pesticide Application Data</b>                              | <b>Number of States</b> | <b>Amount Applied (lbs/year)</b> | <b>Date</b>       | <b>Toxic Release Data</b>                          | <b>Number of States</b> | <b>Amount Released (lbs/year)</b> | <b>Chemical Production Data</b>                    | <b>Production Volume (lbs/year)</b> |                         |             |       |
| Estimated Annual Agricultural Pesticide Use (USGS)             | 34                      | 4,113,376                        | 2016              | Toxic Release Inventory (TRI) Program (EPA) (2016) | 4                       | 474                               | Chemical Data Reporting (CDR) Results (EPA) (2016) |                                     |                         |             |       |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 7                 | Sites               | 41                   | 0.00065                 | 0.0013                 | 0.0086                    | 0.24                    | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 61                            | 1                 | Sites               | 1.64                 | 13                      | 13                     | 13                        | 13                      | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 461                           | 40                | Sites               | 8.68                 | 0.01                    | 0.079                  | 0.414                     | 1.69                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 950                           | 1                 | Sites               | 0.11                 | 0.02                    | 0.02                   | 0.02                      | 0.02                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 1,411                         | 41                | Sites               | 2.91                 | 0.01                    | 0.0781                 | 0.406                     | 1.69                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 13                | Sites               | 5.68                 | 0.00065                 | 0.0026                 | 0.012                     | 0.86                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 7                 | Sites               | 3.2                  | 0.001299                | 0.00245                | 0.0109                    | 0.0311                  | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 6                 | Sites               | 50                   | 0.00065                 | 0.0026                 | 0.012                     | 0.86                    | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 702                           | 101               | Sites               | 14                   | 0.052                   | 0.141                  | 0.928                     | 13.59                   | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 4                 | Sites               | 11                   | 0.0217                  | 0.0426                 | 0.0881                    | 0.1057                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                                  |      | 0.00000081                              |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|-------------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.53805    | days                    |       |
| Boiling point                                                     | OPERA QSAR | 284.826    | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 307.8      | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.0000244  | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.0000138  | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.00286854 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.00436516 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 3.64059    | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 2.95801    | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 6.94E-09   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 2.87665    | no units                |       |

**2-Methyl-4-chlorophenoxyacetic acid (MCPA)**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 402              | USEPA. 2018. MCPA. Draft Human Health Risk Assessment in Support of Registration Review. EPA-HQ-OPP-2014-0180-0043. DP No. D446323. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                     |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**2-Methylnaphthalene**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                                                                                             |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Name:           | 2-Methylnaphthalene                                                                                                                         |
| CASRN:          | 91-57-6                                                                                                                                     |
| DTXSID:         | <a href="#">DTXSID4020878</a>                                                                                                               |
| Use:            | Insecticide; small quantities for the production of alkylmethylnaphthalene sulfonates as textile auxiliaries, surfactants, and emulsifiers. |
| Chemical Notes: |                                                                                                                                             |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.0021                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects | 8          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 20                     | pulmonary alveolar proteinosis | general population | IRIS              | 2003                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0416                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**2-Methylnaphthalene**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units     | Assessment Source | Critical Study     | Critical Effect                | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|--------------------|--------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.004 | mg/kg/day | IRIS 2003         | Murata et al. 1997 | pulmonary alveolar proteinosis | general population | 33.8                        | 23.7       | [254]                    |       |
| Reference Dose (RfD) or Equivalent | 0.04  | mg/kg/day | ATSDR 2005        | Murata et al. 1997 | pulmonary alveolar proteinosis | general population | 33.8                        | 237        | [23]                     |       |
| Cancer Classification (CC)         | I     |           | PPRTV 2007        |                    |                                |                    |                             |            | [279]                    |       |
| Cancer Classification (CC)         | I     |           | IRIS 2003         |                    |                                |                    |                             |            | [254]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     | 2006-09-01           | 2020-03-25         | 71                                             | 0                                               | 0                                              |                                                   |

**Other Health Data**

| Data Element                                | Value | Units     | Source    | Notes |
|---------------------------------------------|-------|-----------|-----------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |           |       |
| Chronic Health-Based Guidance Value         | 0.008 | mg/L      | MN DOH    |       |
| Subchronic Provisional RfD                  | 0.004 | mg/kg/day | EPA PPRTV |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 1630  | mg/kg   | NIH HSDB                |       |
| Percent of active toxcast in vitro assays tested | 0     | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0094406 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   |           |          | TEST QSAR |       |
| Developmental toxin test | 0.514     | no units | TEST QSAR |       |



Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

2-Methylnaphthalene

CCL 5 Contaminant Information Sheet

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OCCURRENCE DATA

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 567                           | 12                | Sites              | 2.12                 | 0.003                   | 0.013                  | 0.0416                    | 0.16                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 88                            | 8                 | Sites              | 9.09                 | 0.003                   | 0.01                   | 0.028                     | 0.05                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 479                           | 4                 | Sites              | 0.84                 | 0.011                   | 0.0275                 | 0.108                     | 0.16                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) | 1M - 10M                     |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 750                           | 120               | Sites               | 16                   | 0.003                   | 0.01                   | 0.05                      | 6                       | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 782                           | 65                | Sites               | 8.31                 | 0.003                   | 0.014                  | 0.0343                    | 610                     | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,532                         | 185               | Sites               | 12                   | 0.003                   | 0.012                  | 0.0499                    | 610                     | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                            | 2                 | Sites               | 5.26                 | 0.0076                  | 0.00875                | 0.00967                   | 0.0099                  | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.00000578                              |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 14.9141     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 246.408     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 246.201     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.026447    | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.0272898   | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000157227 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00013213  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 72.8094     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 358.922     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000535625 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.94282     | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                          |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 23               | ATSDR. 2005. Toxicological Profile for Naphthalene, 1-Methylnaphthalene, and 2-Methylnaphthalene. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                           |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.        |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922). |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                      |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.        |
| 254              | USEPA. 2003. Chemical Assessment Summary, 2-Methylnaphthalene. U.S. Environmental Protection Agency, National Center for Environmental Protection, Integrated Risk Information System (IRIS), Washington, D.C.                                                                                          |
| 279              | USEPA. 2007. Provisional Peer-Reviewed Toxicity Values for 2-Methylnaphthalene. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH.                                 |

**6-Chloro-1,3,5-triazine-2,4-diamine**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                        |                                     |
|------------------------|-------------------------------------|
| <b>Name:</b>           | 6-Chloro-1,3,5-triazine-2,4-diamine |
| <b>CASRN:</b>          | 3397-62-4                           |
| <b>DTXSID:</b>         | <a href="#">DTXSID1037806</a>       |
| <b>Use:</b>            | Herbicide                           |
| <b>Chemical Notes:</b> |                                     |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.00095                    |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 4       | reproductive and developmental effects | 10         | 5         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                          | Target Pop.               | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------|---------------------------|-------------------|----------------------|
| HRL                                                      | 400                    | attenuation of LH surge in females ages 13-49 (estrous cycle disruption) | women of childbearing age | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.382                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

6-Chloro-1,3,5-triazine-2,4-diamine  
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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units     | Assessment Source | Critical Study     | Critical Effect                                                          | Target Population         | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|--------------------|--------------------------------------------------------------------------|---------------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.076 | mg/kg/day | OPP 2018          | Cooper et al. 2010 | attenuation of LH surge in females ages 13-49 (estrous cycle disruption) | women of childbearing age | 35.4                        | 429        | [395]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2018          |                    |                                                                          |                           |                             |            | [395]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                | Value  | Units     | Source                                  | Notes |
|---------------------------------------------|--------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |        |           |                                         |       |
| Acute Human Health Benchmark                | 0.3    | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.01   | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.012  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.012  | mg/L      | Health-based screening levels from USGS |       |
| Maximum Allowable Daily Level               | 100    | ug/day    | CalEPA OEHHA Chemical Database          |       |
| Population-Adjusted Dose (PAD)              | 0.0018 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LOAEL                                            | 25        | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 75        | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 2.5       | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 25        | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 0         | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 7.5999999 | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 0.7       | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0062374 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.176     | no units | TEST QSAR |       |
| Developmental toxin test | 0.628     | no units | TEST QSAR |       |

| Scoring Data                                                   |             |                                  |                      |                       |                         |                            |                           |                              |                            |             |       |
|----------------------------------------------------------------|-------------|----------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
| <b>Finished Water</b>                                          |             |                                  |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                                |             | Prevalence                       |                      |                       |                         | Magnitude                  |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                  |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                  |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                  |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                  |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                  |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                  |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                  |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                  |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                                |             | Prevalence                       |                      |                       |                         | Magnitude                  |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 3,405                            | 656                  | Sites                 | 19                      | 0.0012                     | 0.103                     | 0.382                        | 6.68                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 456                              | 278                  | Sites                 | 61                      | 0.0013                     | 0.105                     | 0.365                        | 2.4                        | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 2,949                            | 378                  | Sites                 | 13                      | 0.0012                     | 0.057                     | 0.778                        | 6.68                       | ug/L        |       |

| Non-Scoring Data                                                       |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|------------------------------------------------------------------------|--|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Non-Nationally Representative Water Data                               |  | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| Finished Water                                                         |  |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                           |  | 2001 - 2013 | 10                            | 3                 | Sites               | 30                   | 0.025                   | 0.05                   | 0.05                      | 0.05                    | ug/L        |       |
|                                                                        |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Ambient Water                                                          |  |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WI (Source)                           |  | 2012-2019   | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)          |  | 2008 - 2017 | 354                           | 137               | Sites               | 39                   | 0.0032                  | 0.0842                 | 0.223                     | 1.35                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)            |  | 2008 - 2017 | 731                           | 188               | Sites               | 26                   | 0.0036                  | 0.16                   | 0.867                     | 2.45                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)              |  | 2008 - 2017 | 1,085                         | 325               | Sites               | 30                   | 0.0032                  | 0.0984                 | 0.406                     | 2.45                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated) |  | 2001 - 2013 | 227                           | 76                | Sites               | 33                   | 0.015                   | 0.05                   | 0.368                     | 2.9                     | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                        |  | 2001 - 2013 | 218                           | 73                | Sites               | 33                   | 0.015                   | 0.0865                 | 0.457                     | 2.9                     | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                          |  | 2001 - 2013 | 10                            | 3                 | Sites               | 30                   | 0.025                   | 0.05                   | 0.05                      | 0.12                    | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                     |  | 2012 - 2014 | 38                            | 7                 | Sites               | 18                   | 0.027                   | 0.074                  | 0.122                     | 0.17                    | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                      |  | 2012 - 2013 | 584                           | 86                | Sites               | 15                   | 0.0012                  | 0.132                  | 1.28                      | 6.3                     | ug/L        |       |
|                                                                        |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Waste Water Effluent                                                   |  |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
|                                                                        |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                        |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                       |  | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                        |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|-------------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 8.42524    | days                    |       |
| Boiling point                                                     | OPERA QSAR | 317.078    | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 277.429    | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 7.01E-09   | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.00000585 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.00462445 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0302691  | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 2.87554    | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 1.65577    | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 7.17E-08   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | -0.196188  | no units                |       |

**6-Chloro-1,3,5-triazine-2,4-diamine**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 395              | USEPA. 2018. Atrazine. Draft Human Health Risk Assessment for Registration Review. EPQ-HQ-OPP-2013-0266-1159. DP No. D418316. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                           |

**Acephate**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Acephate                      |
| CASRN:          | 30560-19-1                    |
| DTXSID:         | <a href="#">DTXSID8023846</a> |
| Use:            | Insecticide                   |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.44                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 7       | reproductive and developmental effects | 9          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                        | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.4                    | inhibition of brain acetylcholinesterase in male postnatal day 11 pups | bottle-fed infants | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.1758                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

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CCL 5 Contaminant Information Sheet

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value  | Units     | Assessment Source | Critical Study | Critical Effect                                  | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|----------------|--------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0003 | mg/kg/day | OPP 2018          | Hoberman 2003  | inhibition of brain AChE in male pups on PND 11. | bottle-fed infants | 151                         | 0.397      | [394]                    |       |
| Cancer Classification (CC)         | C      |           | OPP 2018          |                |                                                  |                    |                             |            | [394]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                | Value  | Units     | Source                                  | Notes |
|---------------------------------------------|--------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |        |           |                                         |       |
| Acute Human Health Benchmark                | 0.03   | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.005  | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.0077 | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.0077 | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.0012 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 233   | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 945   | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 0.25  | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 75    | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 2.5   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 20    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 1.43  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 0.12  | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0019999 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.202     | no units | TEST QSAR |       |
| Developmental toxin test | 0.743     | no units | TEST QSAR |       |



Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Acephate  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects                | PWS/ Sites/ Samples | Percent with Detects                               | Minimum Conc. (Detects) | Median Conc. (Detects)  | 90th Percentile (Detects)         | Maximum Conc. (Detects)                            | Conc. Units | Notes                               |
|----------------------------------------------------------------|-------------|-------------------------------|----------------------------------|---------------------|----------------------------------------------------|-------------------------|-------------------------|-----------------------------------|----------------------------------------------------|-------------|-------------------------------------|
| <b>Finished Water</b>                                          |             | <b>Prevalence</b>             |                                  |                     |                                                    | <b>Magnitude</b>        |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                                  |                     |                                                    |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                                  |                     |                                                    |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                                  |                     |                                                    |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                                  |                     |                                                    |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                                  |                     |                                                    |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                                  |                     |                                                    |                         |                         |                                   |                                                    |             |                                     |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                                  |                     |                                                    |                         |                         |                                   |                                                    |             |                                     |
| <b>Ambient Water</b>                                           |             | <b>Prevalence</b>             |                                  |                     |                                                    | <b>Magnitude</b>        |                         |                                   |                                                    |             |                                     |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,760                         | 135                              | Sites               | 7.67                                               | 0.00051                 | 0.0212                  | 0.176                             | 10.4                                               | ug/L        |                                     |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 322                           | 131                              | Sites               | 41                                                 | 0.00051                 | 0.0212                  | 0.175                             | 10.4                                               | ug/L        |                                     |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,438                         | 4                                | Sites               | 0.28                                               | 0.00267                 | 0.00749                 | 0.14                              | 0.229                                              | ug/L        |                                     |
| <b>Pesticide Application Data</b>                              |             | <b>Number of States</b>       | <b>Amount Applied (lbs/year)</b> | <b>Date</b>         | <b>Toxic Release Data</b>                          |                         | <b>Number of States</b> | <b>Amount Released (lbs/year)</b> | <b>Chemical Production Data</b>                    |             | <b>Production Volume (lbs/year)</b> |
| Estimated Annual Agricultural Pesticide Use (USGS)             |             | 36                            | 4,373,575                        | 2016                | Toxic Release Inventory (TRI) Program (EPA) (2016) |                         | 4                       | 27,210                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |             | 25K - 100K                          |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             | <b>Prevalence</b>             |                   |                     |                      | <b>Magnitude</b>        |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             | <b>Prevalence</b>             |                   |                     |                      | <b>Magnitude</b>        |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 3                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 307                           | 33                | Sites               | 11                   | 0.00082                 | 0.0445                 | 0.277                     | 10.4                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 528                           | 2                 | Sites               | 0.38                 | 0.00788                 | 0.113                  | 0.176                     | 0.218                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 835                           | 35                | Sites               | 4.19                 | 0.00082                 | 0.0445                 | 0.275                     | 10.4                    | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 118                           | 34                | Sites               | 29                   | 0.132                   | 0.454                  | 2.7                       | 13.5                    | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 584                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             | <b>Prevalence</b>             |                   |                     |                      | <b>Magnitude</b>        |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 6.17E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) | < LOD                        | ug/l  |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value     | Units                   | Notes |
|----------------------------------------------------------------|------------|-----------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.55348   | days                    |       |
| Boiling point                                                  | OPERA QSAR | 271.255   | degree C                |       |
| Boiling point                                                  | TEST QSAR  |           |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 0.0000222 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  |           |                         |       |
| Solubility in water                                            | OPERA QSAR | 3.1318    | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.408319  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 1.22201   | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  |           |                         |       |
| Henry's Law constant                                           | OPERA QSAR | 4.76E-09  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | -0.710368 | no units                |       |

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CCL 5 Contaminant Information Sheet

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 394              | USEPA. 2018. Acephate. Revised Draft Human Health Risk Assessment (DRA) in Support of Registration Review. EPA-HQ-OPP-2008-0915-0025. DP No. D446177. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                   |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                    |

**Acetamiprid**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Acetamiprid                   |
| CASRN:          | 135410-20-7                   |
| DTXSID:         | <a href="#">DTXSID0034300</a> |
| Use:            | Insecticide                   |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.000065                   |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 4       | non-cancer effects | 10         | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                          | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 400                    | reduced body weight and body weight gain in females, hepatocellular vacuolation in males | general population | OPP               | 2017                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.02615                      | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Acetamiprid

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                                                                          | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.071 | mg/kg/day | OPP 2017          | Hatch 1999     | reduced body weight and body weight gain in females, hepatocellular vacuolation in males | general population | 33.8                        | 420        | [375]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2017          |                |                                                                                          |                    |                             |            | [375]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 0.7   | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.1   | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.45  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.45  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.071 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 146       | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 217       | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 17.5      | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 65.599998 | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 25.2      | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 8.8       | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 1.74      | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 250.10001 | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic LOAEL                                 | 32        | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 129.4     | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 14        | mg/kg/day | EPA Toxicity Reference Database | min   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0028314 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.819     | no units | TEST QSAR |       |
| Developmental toxin test | 0.6       | no units | TEST QSAR |       |

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Acetamiprid  
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OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             | <b>Prevalence</b>             |                   |                     |                      | <b>Magnitude</b>        |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             | <b>Prevalence</b>             |                   |                     |                      | <b>Magnitude</b>        |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 5                             | 2                 | Sites               | 40                   | 0.0025                  | 0.004                  | 0.0262                    | 0.0456                  | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 5                             | 2                 | Sites               | 40                   | 0.0025                  | 0.004                  | 0.0262                    | 0.0456                  | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 36               | 107,391                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             | <b>Prevalence</b>             |                   |                     |                      | <b>Magnitude</b>        |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 10                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             | <b>Prevalence</b>             |                   |                     |                      | <b>Magnitude</b>        |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 130                           | 7                 | Sites               | 5.38                 | 0.0023                  | 0.0144                 | 0.137                     | 0.227                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 12                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 142                           | 7                 | Sites               | 4.93                 | 0.0023                  | 0.0144                 | 0.137                     | 0.227                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 227                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 218                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 10                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 178                           | 8                 | Sites               | 4.49                 | 0.0262                  | 0.0606                 | 0.165                     | 0.199                   | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 1                 | Sites               | 2.63                 | 0.0395                  | 0.0395                 | 0.0395                    | 0.0395                  | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             | <b>Prevalence</b>             |                   |                     |                      | <b>Magnitude</b>        |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Exposure exposure                               |      | 8.48E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value     | Units                   | Notes |
|----------------------------------------------------------------|------------|-----------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.87165   | days                    |       |
| Boiling point                                                  | OPERA QSAR | 315.067   | degree C                |       |
| Boiling point                                                  | TEST QSAR  |           |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 0.0000916 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  |           |                         |       |
| Solubility in water                                            | OPERA QSAR | 0.044269  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0494311 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 9.32437   | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  |           |                         |       |
| Henry's Law constant                                           | OPERA QSAR | 3.46E-09  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 1.19577   | no units                |       |

**Acetamiprid**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                         |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                       |
| 375              | USEPA. 2017. Acetamiprid. Acute and Chronic Dietary Exposure and Risk Assessment for Registration Review. EPA-HQ-OPP-2012-0329-0022. DP No. D443740. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                        |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society. |

**Acetochlor ethanesulfonic acid (ESA)**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                        |                                      |
|------------------------|--------------------------------------|
| <b>Name:</b>           | Acetochlor ethanesulfonic acid (ESA) |
| <b>CASRN:</b>          | 187022-11-3                          |
| <b>DTXSID:</b>         | <a href="#">DTXSID6037483</a>        |
| <b>Use:</b>            | Pesticide degradate                  |
| <b>Chemical Notes:</b> |                                      |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                                 |                                   |
|---------------------------------|-----------------------------------|
| <b>Draft CCL5 List Decision</b> | <b>Final Hazard Quotient (HQ)</b> |
| Not List                        | 0.004                             |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 4       | reproductive and developmental effects | 3          | 7         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                                | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 300                    | decreased body weight and weight gain, decreased food utilization; increased TSH, T4, and T3; increased relative testes weight | general population | MDH               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 1.190526                     | 90th Percentile                               | Finished Water                       | UCMR2  | 2008-2010 |

**PUBLIC NOMINATION STATUS**

|                          |
|--------------------------|
| <b>Public Nomination</b> |
|                          |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     | X     | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Acetochlor ethanesulfonic acid (ESA)

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                                                                                                                | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.056 | mg/kg/day | MDH 2018          | Lees 2000      | decreased body weight and weight gain, decreased food utilization; increased TSH, T4, and T3; increased relative testes weight | general population | 33.8                        | 331                        | [142]                    |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                      | Value | Units | Source | Notes |
|---------------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b>       |       |       |        |       |
| Acute Health-Based Guidance Value                 | 0.5   | mg/L  | MN DOH |       |
| Acute Health-Based Guidance Value                 | 0.6   | mg/L  | MN DOH |       |
| Chronic Health-Based Guidance Value               | 0.3   | mg/L  | MN DOH |       |
| Chronic Health-Based Guidance Value               | 0.3   | mg/L  | MN DOH |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.5   | mg/L  | MN DOH |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.6   | mg/L  | MN DOH |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| Percent of active toxcast in vitro assays tested | 0.71  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value    | Units    | Source    | Notes |
|--------------------------|----------|----------|-----------|-------|
| <b>Modeled Data</b>      |          |          |           |       |
| LD50                     | 0.011695 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.55     | no units | TEST QSAR |       |
| Developmental toxin test | 1.155    | no units | TEST QSAR |       |



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Acetochlor ethanesulfonic acid (ESA)  
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OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 | 1,198                         | 2                 | Sites              | 0.17                 | 1.10526                 | 1.15                   | 1.19                      | 1.2                     | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 2,719                         | 325               | Sites              | 12                   | 0.012                   | 0.266                  | 1.11                      | 13.2                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 419                           | 212               | Sites              | 51                   | 0.012                   | 0.272                  | 1.12                      | 13.2                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 2,300                         | 113               | Sites              | 4.91                 | 0.02                    | 0.14                   | 0.823                     | 12.3                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                         | 2006 - 2020 | 4                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                           | 2001 - 2013 | 17                            | 7                 | Sites               | 41                   | 0.0027                  | 0.039                  | 0.484                     | 1.2                     | ug/L        |       |
| Bradley et al. 2018 (Finished) [53]                                    | 2016        | 26                            | 3                 | Sites               | 12                   | 0.05                    | 0.09                   | 0.106                     | 0.11                    | ug/L        |       |
| <b>Ambient Water</b>                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                           | 2006 - 2020 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)          | 2008 - 2017 | 354                           | 73                | Sites               | 21                   | 0.02                    | 0.174                  | 0.62                      | 1.75                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)            | 2008 - 2017 | 826                           | 52                | Sites               | 6.3                  | 0.02                    | 0.15                   | 0.478                     | 0.88                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)              | 2008 - 2017 | 1,180                         | 125               | Sites               | 11                   | 0.02                    | 0.17                   | 0.581                     | 1.75                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated) | 2001 - 2013 | 229                           | 155               | Sites               | 68                   | 0.002664                | 0.063                  | 0.51                      | 1.9                     | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                        | 2001 - 2013 | 219                           | 148               | Sites               | 68                   | 0.002664                | 0.0654                 | 0.161                     | 1.75                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                          | 2001 - 2013 | 12                            | 7                 | Sites               | 58                   | 0.0027                  | 0.059                  | 0.579                     | 1.9                     | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                     | 2012 - 2014 | 38                            | 9                 | Sites               | 24                   | 0.02                    | 0.06                   | 0.566                     | 0.67                    | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                      | 2012 - 2013 | 584                           | 23                | Sites               | 3.94                 | 0.038                   | 0.178                  | 0.481                     | 0.695                   | ug/L        |       |
| <b>Waste Water Effluent</b>                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 0.000000125                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.28498     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 314.606     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 382.116     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000000167 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  |             |                         |       |
| Solubility in water                                            | OPERA QSAR | 0.0136286   | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00744732  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 9.7255      | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 7.31139     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 5.13E-10    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.7785      | no units                |       |

**Acetochlor ethanesulfonic acid (ESA)**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985.                                                                    |
| 140              | MDH. 2016. Toxicological Summary for: Alachlor ESA and Alachlor OXA. Health Based Guidance for Water. Minnesota Department of Health (MDH), Environmental Health Division, Health Risk Assessment Unit, St Paul, MN.                                                                                                                                                                                                               |
| 142              | MDH. 2018. Toxicological Summary for: Acetochlor ESA. Health Based Guidance for Water. Minnesota Department of Health (MDH), Environmental Health Division, Health Risk Assessment Unit, St Paul, MN.                                                                                                                                                                                                                              |

**Acetochlor oxanilic acid (OA)**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                        |                               |
|------------------------|-------------------------------|
| <b>Name:</b>           | Acetochlor oxanilic acid (OA) |
| <b>CASRN:</b>          | 194992-44-4                   |
| <b>DTXSID:</b>         | <a href="#">DTXSID1037484</a> |
| <b>Use:</b>            | Pesticide degradate           |
| <b>Chemical Notes:</b> |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                                 |                                   |
|---------------------------------|-----------------------------------|
| <b>Draft CCL5 List Decision</b> | <b>Final Hazard Quotient (HQ)</b> |
| Not List                        | 0.01                              |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                      | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 100                    | decreased body weight, body weight gain, and food utilization; decreased thyroid stimulating hormone | general population | MDH               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 1.039                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                          |
|--------------------------|
| <b>Public Nomination</b> |
|                          |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     | X     | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**Acetochlor oxanilic acid (OA)**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element                       | Value | Units     | Assessment Source | Critical Study                      | Critical Effect                                                                                      | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|-------------------------------------|------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.019 | mg/kg/day | MDH 2018          | Albin and Kraus 2000; Williams 2000 | decreased body weight, body weight gain, and food utilization; decreased thyroid stimulating hormone | general population | 33.8                        | 112                        | [143]                    |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                      | Value | Units | Source | Notes |
|---------------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b>       |       |       |        |       |
| Acute Health-Based Guidance Value                 | 0.1   | mg/L  | MN DOH |       |
| Acute Health-Based Guidance Value                 | 0.2   | mg/L  | MN DOH |       |
| Chronic Health-Based Guidance Value               | 0.09  | mg/L  | MN DOH |       |
| Chronic Health-Based Guidance Value               | 0.1   | mg/L  | MN DOH |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.1   | mg/L  | MN DOH |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.2   | mg/L  | MN DOH |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0098628 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.261     | no units | TEST QSAR |       |
| Developmental toxin test | 0.88      | no units | TEST QSAR |       |

| Scoring Data                                                   |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 | 1,198                         | 0                 | Sites              | 0                    |                         |                        |                           |                         | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 2,724                         | 246               | Sites              | 9.03                 | 0.0053                  | 0.217                  | 1.04                      | 15.4                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 422                           | 203               | Sites              | 48                   | 0.0053                  | 0.218                  | 1.04                      | 15.4                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 2,302                         | 43                | Sites              | 1.87                 | 0.02                    | 0.14                   | 0.5                       | 15                      | ug/L        |       |

| Non-Scoring Data                                                       |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|------------------------------------------------------------------------|--|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Non-Nationally Representative Water Data                               |  | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| Finished Water                                                         |  |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                         |  | 2006 - 2020 | 4                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                           |  | 2001 - 2013 | 17                            | 7                 | Sites               | 41                   | 0.00113                 | 0.048                  | 0.615                     | 1.3                     | ug/L        |       |
| Bradley et al. 2018 (Finished) [53]                                    |  | 2016        | 26                            | 3                 | Sites               | 12                   | 0.02                    | 0.17                   | 0.186                     | 0.19                    | ug/L        |       |
| Ambient Water                                                          |  |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                           |  | 2006 - 2020 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)          |  | 2008 - 2017 | 355                           | 87                | Sites               | 25                   | 0.0194                  | 0.15                   | 0.567                     | 1.76                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)            |  | 2008 - 2017 | 830                           | 30                | Sites               | 3.61                 | 0.02                    | 0.05                   | 0.295                     | 0.54                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)              |  | 2008 - 2017 | 1,185                         | 117               | Sites               | 9.87                 | 0.0194                  | 0.133                  | 0.532                     | 1.76                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated) |  | 2001 - 2013 | 229                           | 129               | Sites               | 56                   | 0.00113                 | 0.062                  | 0.74                      | 1.9                     | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                        |  | 2001 - 2013 | 219                           | 122               | Sites               | 56                   | 0.002331                | 0.0544                 | 0.0986                    | 1.03                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                          |  | 2001 - 2013 | 12                            | 7                 | Sites               | 58                   | 0.00113                 | 0.0705                 | 0.82                      | 1.9                     | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                     |  | 2012 - 2014 | 38                            | 6                 | Sites               | 16                   | 0.03                    | 0.075                  | 0.54                      | 0.56                    | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                      |  | 2012 - 2013 | 584                           | 6                 | Sites               | 1.03                 | 0.103                   | 0.172                  | 0.438                     | 0.628                   | ug/L        |       |
| Waste Water Effluent                                                   |  |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
|                                                                        |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                       |  | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                        |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.35388     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 320.906     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 367.714     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.000000214 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.000000653 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.00519245  | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.00289068  | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 2.91563     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 1.2331      | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 7.1E-10     | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 2.60609     | no units                |       |

**Acetochlor oxanilic acid (OA)**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985.                                                                    |
| 143              | MDH. 2018. Toxicological Summary for: Acetochlor OXA. Health Based Guidance for Water. Minnesota Department of Health (MDH), Environmental Health Division, Health Risk Assessment Unit, St Paul MN.                                                                                                                                                                                                                               |

**Acetophenone**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                    |
|-----------------|------------------------------------|
| Name:           | Acetophenone                       |
| CASRN:          | 98-86-2                            |
| DTXSID:         | <a href="#">DTXSID6021828</a>      |
| Use:            | Photosensitizing agents; flavoring |
| Chemical Notes: |                                    |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.0005                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 4       | no adverse effects | 8          | 5         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                          | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 600                    | no adverse effects identified at the highest dose tested | general population | IRIS              | 1988                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.3                          | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**Acetophenone**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units     | Assessment Source | Critical Study    | Critical Effect                                          | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                                                          |
|------------------------------------|-------|-----------|-------------------|-------------------|----------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.1   | mg/kg/day | IRIS 1988         | Hagen et al. 1967 | no adverse effects identified at the highest dose tested | general population | 33.8                        | 592        | [197]                    | NOTE: the 2011 PPRTV assessment declines to derive a chronic RfD for acetophenone because a non-cancer assessment is available |
| Cancer Classification (CC)         | D     |           | IRIS 1988         |                   |                                                          |                    |                             |            | [197]                    | NOTE: the 2011 PPRTV assessment declines to derive a chronic RfD for acetophenone because a non-cancer assessment is available |
| Cancer Classification (CC)         | D     |           | PPRTV 2011        |                   |                                                          |                    |                             |            | [322]                    |                                                                                                                                |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     | 2010-06-01           | 2020-04-14         | 232                                            | 2                                               | 0                                              |                                                   |

**Other Health Data**

| Data Element                                | Value | Units     | Source    | Notes |
|---------------------------------------------|-------|-----------|-----------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |           |       |
| Subchronic Provisional RfD                  | 0.8   | mg/kg/day | EPA PPRTV |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 3000  | mg/kg   | NIH HSDB                | max   |
| LD50                                             | 740   | mg/kg   | NIH HSDB                | min   |
| Percent of active toxcast in vitro assays tested | 0.88  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0125893 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.094     | no units | TEST QSAR |       |
| Developmental toxin test | 0.333     | no units | TEST QSAR |       |



## Acetophenone

CCL 5 Contaminant Information Sheet

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 563                                 | 11                   | Sites                 | 1.95                    | 0.1                        | 0.2                       | 0.3                          | 0.5                        | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 88                                  | 11                   | Sites                 | 12                      | 0.1                        | 0.2                       | 0.3                          | 0.5                        | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 475                                 | 0                    | Sites                 | 0                       |                            |                           |                              |                            |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) | 13                  | 981,013                       | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) | 10M - 50M                    |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                                  | NA                   | Sites                  | 4                       |                            | 0.58                      |                              | 0.58                       | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 743                                 | 49                   | Sites                  | 6.59                    | 0.1                        | 0.3                       | 4.07                         | 5.3                        | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 715                                 | 6                    | Sites                  | 0.84                    | 0.2                        | 0.35                      | 2.08                         | 2.5                        | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,458                               | 55                   | Sites                  | 3.77                    | 0.1                        | 0.3                       | 3.25                         | 5.3                        | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                                  | NA                   | Sites                  | 0                       |                            |                           |                              |                            | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                                   | 1                    | Sites                  | 50                      | 0.3                        | 0.3                       | 0.3                          | 0.3                        | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                                  | 9                    | Sites                  | 43                      | 0.22                       | 0.29                      | 0.36                         | 0.37                       | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                       | <b>Value</b>         | <b>Units</b>           | <b>Model</b>            | <b>Notes</b>               |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expcast exposure                                   |      | 0.0000215                                     |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value     | Units                   | Notes |
|-------------------------------------------------------------------|------------|-----------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 5.40713   | days                    |       |
| Boiling point                                                     | OPERA QSAR | 200.433   | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 209.024   | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.427749  | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.542001  | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0393752 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0215278 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 9.03932   | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 7.63836   | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.000011  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 1.70555   | no units                |       |

**Acetophenone**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                  |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. Science of The Total Environment. v581-582, (909-922). |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                              |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. Science of the Total Environment, 636, 69-79.        |
| 197              | USEPA. 1988. Chemical Assessment Summary, Acetophenone. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, DC.                                                                                          |
| 322              | USEPA. 2011. Provisional Peer-Reviewed Toxicity Values for Acetophenone. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH.                                |

**Acrolein**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                     |
|-----------------|-----------------------------------------------------|
| Name:           | Acrolein                                            |
| CASRN:          | 107-02-8                                            |
| DTXSID:         | <a href="#">DTXSID5020023</a>                       |
| Use:            | Aquatic herbicide; rodenticide; industrial chemical |
| Chemical Notes: |                                                     |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.14                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects | 3          | 7         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                             | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 20                     | forestomach squamous epithelial hyperplasia | general population | ATSDR             | 2007                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 2.7                          | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Acrolein

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study       | Critical Effect                             | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                                                                                                                                                                                                 |
|------------------------------------|--------|-----------|-------------------|----------------------|---------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.0005 | mg/kg/day | IRIS 2003         | Parent et al., 1992c | increased mortality                         | general population | 33.8                        | 2.96       | [258]                    |                                                                                                                                                                                                                                                                       |
| Reference Dose (RfD) or Equivalent | 0.004  | mg/kg/day | ATSDR 2007        | NTP 2006             | forestomach squamous epithelial hyperplasia | general population | 33.8                        | 23.7       | [26]                     | NOTE: no toxicity values were provided in the 2015 OPP assessment because chronic and acute oral exposures to acrolein are not expected based on use patterns, physical-chemical properties, and plant metabolism data. Therefore, the ATSDR assessment was chosen as |
| Cancer Classification (CC)         | I      |           | OPP 2015          |                      |                                             |                    |                             |            | [338]                    |                                                                                                                                                                                                                                                                       |
| Cancer Classification (CC)         | I      |           | IRIS 2003         |                      |                                             |                    |                             |            | [258]                    |                                                                                                                                                                                                                                                                       |
|                                    |        |           | PPRTV 2002        |                      |                                             |                    |                             |            | [252]                    |                                                                                                                                                                                                                                                                       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                     | Value   | Units     | Source                            | Notes |
|--------------------------------------------------|---------|-----------|-----------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |         |           |                                   |       |
| Acute Inhalation Minimal Risk Level (MRL)        | 0.003   | ppm       | CDC ATSDR                         |       |
| Cancer Classification (CC)                       | 3       | no units  | WHO IARC                          |       |
| Human Health Ambient Water Quality Criteria      | 0.003   | mg/L      | EPA Human Health Criteria for CWA |       |
| Intermediate Inhalation Minimal Risk Level (MRL) | 0.00004 | ppm       | CDC ATSDR                         |       |
| Intermediate Minimal Risk Level (MRL)            | 0.004   | mg/kg/day | CDC ATSDR                         |       |
| Reference Concentration (RfC)                    | 0.35    | ug/m^3    | CalEPA OEHHA Chemical Database    |       |
| Reference Concentration (RfC)                    | 0.00002 | mg/m^3    | EPA IRIS                          |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 10.3  | mg/kg   | NIH HSDB                | min   |
| LD50                                             | 46    | mg/kg   | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 0.85  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0011588 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.51      | no units | TEST QSAR |       |
| Developmental toxin test | 0.641     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Acrolein  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,183                         | 3                 | Sites              | 0.25                 | 1                       | 2                      | 2.7                       | 3                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 102                           | 3                 | Sites              | 2.94                 | 1                       | 2                      | 2.7                       | 3                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,081                         | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) | 25               | 1,242,926                  | Chemical Data Reporting (CDR) Results (EPA) (2016) | 250M - 500M                  |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 19                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 69                            | 5                 | Sites               | 7.25                 | 0.4                     | 1.3                    | 4.44                      | 7.5                     | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 21                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 89                            | 5                 | Sites               | 5.62                 | 0.4                     | 1.3                    | 4.44                      | 7.5                     | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Arnold et al. 2016 (Unfiltered) [7]                                                    | 2012 - 2013 | 527                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.000000128                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHanes biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHanes biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHanes biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value     | Units                   | Notes |
|----------------------------------------------------------------|------------|-----------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.67473   | days                    |       |
| Boiling point                                                  | OPERA QSAR | 59.2581   | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 52.443    | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 199.082   | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 210.378   | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 4.7652    | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 1.77419   | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 3.77906   | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  |           |                         |       |
| Henry's Law constant                                           | OPERA QSAR | 0.0000817 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 0.0512154 | no units                |       |

**Acrolein**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 26               | ATSDR. 2007. Toxicological Profile for Acrolein. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                                                                                                                                                                       |
| 252              | USEPA. 2002. Provisional Peer-Reviewed Toxicity Values for Acrolein. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH.                                                                                                                                                                       |
| 258              | USEPA. 2003. Toxicological Review of Acrolein (CAS No. 107-02-8). U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, D.C.                                                                                                                                                                                                                  |
| 338              | USEPA. 2015. Acrolein: Human Health Assessment Scoping Document in Support of Registration Review. EPA-HQ-OPP-2015-0571-0005. DP No. D427578. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                           |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                    |

**Acyclovir**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Acyclovir                     |
| CASRN:          | 59277-89-3                    |
| DTXSID:         | <a href="#">DTXSID1022556</a> |
| Use:            | antiviral                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.012                      |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects | 9          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                    | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 20                     | lowest therapeutic dose: antiviral/reduce duration and severity of herpes and chickenpox infection | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.248                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Acyclovir

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|--------------------------|------------|--------------------------|-------|
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|--------------------------|------------|--------------------------|-------|

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value  | Units     | Assessment Source  | Critical Study            | Critical Effect                                                                                    | Target Population  | Exposure Factor (mL/kg-) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                 |
|------------------------------------|--------|-----------|--------------------|---------------------------|----------------------------------------------------------------------------------------------------|--------------------|--------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.0025 | mg/kg/day | FDA 2018; NIH 2018 | Ranbaxy Laboratories Ltd. | lowest therapeutic dose: antiviral/reduce duration and severity of herpes and chickenpox infection | bottle-fed infants | 151                      | 17.0                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 0.0025 | mg/kg/day | FDA 2018; NIH 2018 | Ranbaxy Laboratories Ltd. | lowest therapeutic dose: antiviral/reduce duration and severity of herpes and chickenpox infection | general population | 33.8                     | 59.0                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References Identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|

## Other Health Data

| Data Element                                            | Value       | Units     | Source              | Notes |
|---------------------------------------------------------|-------------|-----------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |           |                     |       |
| Cancer Classification (CC)                              | 3           | no units  | WHO IARC            |       |
| Maximum Recommended Daily Dose                          | 13.3        | mg/kg/day | FDA                 |       |
| Screening level for pharmaceutical - general population | 0.058823529 | mg/L      | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.016666667 | mg/L      | EPA Office of Water |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 10000 | mg/kg   | NIH HSDB                |       |
| Percent of active toxcast in vitro assays tested | 2.13  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0013836 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.173     | no units | TEST QSAR |       |
| Developmental toxin test | 0.62      | no units | TEST QSAR |       |



## Acyclovir

CCL 5 Contaminant Information Sheet

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 557                           | 16                | Sites               | 2.87                 | 0.00428                 | 0.02                   | 0.248                     | 0.787                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 75                            | 16                | Sites               | 21                   | 0.00428                 | 0.02                   | 0.248                     | 0.787                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 482                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 205                           | 53                | Sites               | 26                   | 0.00644                 | 0.0506                 | 0.238                     | 4.35                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 401                           | 2                 | Sites               | 0.5                  | 0.0565                  | 5.23                   | 8.33                      | 10.4                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 606                           | 55                | Sites               | 9.08                 | 0.00644                 | 0.0509                 | 0.259                     | 10.4                    | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                            | 14                | Sites               | 37                   | 0.0080967               | 0.314                  | 0.484                     | 0.6951437               | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                       | 2013 - 2015 | 1,106                         | 1                 | Sites               | 0.09                 | 0.0056912               | 0.00569                | 0.00569                   | 0.0056912               | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                            | 20                | Sites               | 95                   | 0.1394549               | 0.723                  | 1.43                      | 1.978684                | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.000000148                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.54608     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 307.772     | degree C                |       |
| Boiling point                                                  | TEST QSAR  |             |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 3.19E-10    | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000000125 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00889126  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.018239    | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 1.585       | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 0.179061    | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 7.37E-11    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | -1.51937    | no units                |       |

**Acyclovir**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                  |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. Environmental Science and Technology 53: 2950-2960.                                                   |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. Environmental science & technology, 51(9), 4792-4802.            |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                  |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. Science of The Total Environment. v581-582, (909-922). |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                             |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. Science of the Total Environment, 636, 69-79.        |

## Alachlor ethanesulfonic acid (ESA)

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                    |
|-----------------|------------------------------------|
| Name:           | Alachlor ethanesulfonic acid (ESA) |
| CASRN:          | 142363-53-9                        |
| DTXSID:         | <a href="#">DTXSID6037485</a>      |
| Use:            | Pesticide degradate                |
| Chemical Notes: |                                    |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.018                      |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 3          | 7         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                                                                                                                 | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 70                     | hematological effects including decreased erythrocyte count, hemolytic anemia, decreased hemoglobin, decreased hematocrit and red cells, increased MCH and MCHC, and decreased body weight and body weight gain | general population | MDH               | 2016                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 1.26                         | 90th Percentile                               | Finished Water                       | UCMR2  | 2008-2010 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     | X     | X     |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |
| Not Applicable |                |                |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Alachlor ethanesulfonic acid (ESA)

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value | Units     | Assessment Source | Critical Study                            | Critical Effect                                                                                                                                                                                                 | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.012 | mg/kg/day | MDH 2016          | Heydens et al. 1996; EPA 1998; WDHFS 2005 | hematological effects including decreased erythrocyte count, hemolytic anemia, decreased hemoglobin, decreased hematocrit and red cells, increased MCH and MCHC, and decreased body weight and body weight gain | general population | 33.8                        | 71.0                       | [140]                    |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                      | Value | Units | Source | Notes |
|---------------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b>       |       |       |        |       |
| Chronic Health-Based Guidance Value               | 0.05  | mg/L  | MN DOH |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.1   | mg/L  | MN DOH |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

| Data Element             | Value    | Units    | Source    | Notes |
|--------------------------|----------|----------|-----------|-------|
| <b>Modeled Data</b>      |          |          |           |       |
| LD50                     | 0.011885 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.566    | no units | TEST QSAR |       |
| Developmental toxin test | 1.193    | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Alachlor ethanesulfonic acid (ESA)  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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| Scoring Data                                                   |                           |                               |                   |                                                    |                            |                         |                        |                                                    |                         |             |       |
|----------------------------------------------------------------|---------------------------|-------------------------------|-------------------|----------------------------------------------------|----------------------------|-------------------------|------------------------|----------------------------------------------------|-------------------------|-------------|-------|
| Nationally Representative Water Data                           | Date                      | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples                                 | Percent with Detects       | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects)                          | Maximum Conc. (Detects) | Conc. Units | Notes |
| <b>Finished Water</b>                                          |                           |                               |                   |                                                    |                            |                         |                        |                                                    |                         |             |       |
|                                                                |                           |                               | Prevalence        |                                                    |                            |                         |                        | Magnitude                                          |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019               |                               |                   |                                                    |                            |                         |                        |                                                    |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015               |                               |                   |                                                    |                            |                         |                        |                                                    |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010               | 1,198                         | 3                 | Sites                                              | 0.25                       | 1                       | 1.2                    | 1.26                                               | 1.3                     | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003               |                               |                   |                                                    |                            |                         |                        |                                                    |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997               |                               |                   |                                                    |                            |                         |                        |                                                    |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992               |                               |                   |                                                    |                            |                         |                        |                                                    |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986               |                               |                   |                                                    |                            |                         |                        |                                                    |                         |             |       |
| <b>Ambient Water</b>                                           |                           |                               |                   |                                                    |                            |                         |                        |                                                    |                         |             |       |
|                                                                |                           |                               | Prevalence        |                                                    |                            |                         |                        | Magnitude                                          |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017               | 2,708                         | 553               | Sites                                              | 20                         | 0.015                   | 0.15                   | 1.1                                                | 34                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017               | 418                           | 163               | Sites                                              | 39                         | 0.015                   | 0.14                   | 0.81                                               | 18.9                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017               | 2,290                         | 390               | Sites                                              | 17                         | 0.02                    | 0.215                  | 2.38                                               | 34                      | ug/L        |       |
|                                                                |                           |                               |                   |                                                    |                            |                         |                        |                                                    |                         |             |       |
| Pesticide Application Data                                     |                           |                               |                   | Toxic Release Data                                 |                            |                         |                        | Chemical Production Data                           |                         |             |       |
| Number of States                                               | Amount Applied (lbs/year) | Date                          |                   | Number of States                                   | Amount Released (lbs/year) |                         |                        | Production Volume (lbs/year)                       |                         |             |       |
| Estimated Annual Agricultural Pesticide Use (USGS)             |                           |                               |                   | Toxic Release Inventory (TRI) Program (EPA) (2016) |                            |                         |                        | Chemical Data Reporting (CDR) Results (EPA) (2016) |                         |             |       |

| Non-Scoring Data                                                                       |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               | Prevalence        |                     |                      |                         |                        | Magnitude                 |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 4                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 11                | Sites               | 65                   | 0.0028                  | 0.017                  | 0.0989                    | 1.443                   | ug/L        |       |
| Community Water System Survey (CWSS) (Finished) [178]                                  | 2006        | 1                             | NA                | Sites               |                      |                         | 0.35                   | 0.35                      |                         | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               | Prevalence        |                     |                      |                         |                        | Magnitude                 |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 351                           | 38                | Sites               | 11                   | 0.02                    | 0.06                   | 0.586                     | 1.68                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 822                           | 188               | Sites               | 23                   | 0.02                    | 0.435                  | 1.88                      | 7.07                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 1,173                         | 226               | Sites               | 19                   | 0.02                    | 0.238                  | 1.55                      | 7.07                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 159               | Sites               | 69                   | 0.0028                  | 0.0208                 | 0.14                      | 4.31                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 152               | Sites               | 69                   | 0.0028                  | 0.0562                 | 0.609                     | 4.31                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 8                 | Sites               | 67                   | 0.0028                  | 0.017                  | 0.1                       | 1.037                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 56                            | 1                 | Sites               | 1.79                 | 0.064                   | 0.064                  | 0.064                     | 0.064                   | ug/L        |       |
| Community Water System Survey (CWSS) (Ambient) [178]                                   | 2006        | 1                             | NA                | Sites               |                      |                         | 0.28                   | 4.19                      |                         | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 8                 | Sites               | 21                   | 0.02                    | 0.025                  | 0.119                     | 0.21                    | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 584                           | 33                | Sites               | 5.65                 | 0.12                    | 0.331                  | 1.49                      | 3.37                    | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               | Prevalence        |                     |                      |                         |                        | Magnitude                 |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard)     | Date                         | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|-----------------------------------------------------|------------------------------|-----------------------------------------|-------|
| Expcast exposure                                    |                              | 9.98E-08                                |       |
| <b>Biomonitoring Data</b>                           | Detection at 90th Percentile | Units                                   | Notes |
| NHANES biomonitoring detection in serum (1999-2016) |                              |                                         |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |                                         |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |                                         |       |

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.29515     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 314.576     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 380.403     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000000182 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  |             |                         |       |
| Solubility in water                                            | OPERA QSAR | 0.0112346   | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00360579  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 9.61239     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 7.53356     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 5.21E-10    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.78498     | no units                |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

**Alachlor ethanesulfonic acid (ESA)**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 140              | MDH. 2016. Toxicological Summary for: Alachlor ESA and Alachlor OXA. Health Based Guidance for Water. Minnesota Department of Health (MDH), Environmental Health Division, Health Risk Assessment Unit, St Paul, MN.                                                                                                                                                                                                               |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                                                                                                                                                              |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

## Alachlor oxanilic acid (OA)

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Alachlor oxanilic acid (OA)   |
| CASRN:          | 171262-17-2                   |
| DTXSID:         | <a href="#">DTXSID1037486</a> |
| Use:            | Pesticide degradate           |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.004                      |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                                                                                                                 | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 70                     | hematological effects including decreased erythrocyte count, hemolytic anemia, decreased hemoglobin, decreased hematocrit and red cells, increased MCH and MCHC, and decreased body weight and body weight gain | general population | MDH               | 2016                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.28                         | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

|                   |
|-------------------|
| Public Nomination |
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     | X     | X     |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**Alachlor oxanilic acid (OA)**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element                       | Value | Units     | Assessment Source | Critical Study                            | Critical Effect                                                                                                                                                                                                 | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.012 | mg/kg/day | MDH 2016          | Heydens et al. 1996; EPA 1998; WDHFS 2005 | hematological effects including decreased erythrocyte count, hemolytic anemia, decreased hemoglobin, decreased hematocrit and red cells, increased MCH and MCHC, and decreased body weight and body weight gain | general population | 33.8                        | 71.0                       | [140]                    |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                      | Value | Units | Source | Notes |
|---------------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b>       |       |       |        |       |
| Chronic Health-Based Guidance Value               | 0.05  | mg/L  | MN DOH |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.1   | mg/L  | MN DOH |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0100693 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.532     | no units | TEST QSAR |       |
| Developmental toxin test | 0.974     | no units | TEST QSAR |       |



Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Alachlor oxanilic acid (OA)

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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OCCURRENCE DATA

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             |                               | Prevalence        |                    |                      |                         |                        | Magnitude                 |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 | 1,198                         | 0                 | Sites              | 0                    |                         |                        |                           |                         | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             |                               | Prevalence        |                    |                      |                         |                        | Magnitude                 |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 2,724                         | 271               | Sites              | 9.95                 | 0.0043                  | 0.05                   | 0.28                      | 36                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 422                           | 154               | Sites              | 36                   | 0.0043                  | 0.0494                 | 0.2                       | 13.7                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 2,302                         | 117               | Sites              | 5.08                 | 0.01                    | 0.114                  | 1.06                      | 36                      | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               | Prevalence        |                     |                      |                         |                        | Magnitude                 |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 4                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 7                 | Sites               | 41                   | 0.00102                 | 0.008                  | 0.052                     | 0.4995                  | ug/L        |       |
| Bradley et al. 2018 (Finished) [53]                                                    | 2016        | 26                            | 1                 | Sites               | 3.85                 | 0.32                    | 0.32                   | 0.32                      | 0.32                    | ug/L        |       |
| Community Water System Survey (CWSS) (Finished) [178]                                  | 2006        | 1                             | NA                | Sites               |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               | Prevalence        |                     |                      |                         |                        | Magnitude                 |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 355                           | 44                | Sites               | 12                   | 0.0074                  | 0.03                   | 0.105                     | 0.27                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 830                           | 83                | Sites               | 10                   | 0.0157                  | 0.0671                 | 1.49                      | 3.79                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 1,185                         | 127               | Sites               | 11                   | 0.0074                  | 0.04                   | 0.308                     | 3.79                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 98                | Sites               | 43                   | 0.001016                | 0.008                  | 0.046                     | 5.38                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 92                | Sites               | 42                   | 0.001016                | 0.017                  | 0.338                     | 5.38                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 6                 | Sites               | 50                   | 0.00102                 | 0.008                  | 0.041                     | 0.102                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 56                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Community Water System Survey (CWSS) (Ambient) [178]                                   | 2006        | 1                             | NA                | Sites               |                      |                         | 1.85                   | 1.85                      |                         | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 1                 | Sites               | 2.63                 | 0.02                    | 0.02                   | 0.02                      | 0.02                    | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 584                           | 11                | Sites               | 1.88                 | 0.0374                  | 0.122                  | 0.92                      | 1.45                    | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               | Prevalence        |                     |                      |                         |                        | Magnitude                 |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| ExpoCast exposure                               |      | 0.0000001                               |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.46456     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 320.913     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 368.012     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000000225 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.00000076  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00516306  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0033037   | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 2.90221     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 1.30918     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 7E-10       | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.60613     | no units                |       |

**Alachlor oxanilic acid (OA)**

CCL 5 Contaminant Information Sheet

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985.                                                                    |
| 140              | MDH. 2016. Toxicological Summary for: Alachlor ESA and Alachlor OXA. Health Based Guidance for Water. Minnesota Department of Health (MDH), Environmental Health Division, Health Risk Assessment Unit, St Paul, MN.                                                                                                                                                                                                               |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                                                                                                                                                              |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

## Aldrin

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                                      |
|-----------------|------------------------------------------------------|
| Name:           | Aldrin                                               |
| CASRN:          | 309-00-2                                             |
| DTXSID:         | <a href="#">DTXSID8020040</a>                        |
| Use:            | Former insecticide                                   |
| Chemical Notes: | Canceled pesticide. Last end of use date: 5/15/1987. |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxics                                 | X |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 330                        |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 7       | carcinogen with linear MOA | 1          | 6         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect  | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.002                  | liver carcinomas | general population | OW                | 2003                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date        |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-------------|
| 0.667                        | 90th Percentile                               | Finished Water                       | UCM2   | 1993 - 1997 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1  | RD 2           | RD 3           |
|-------|----------------|----------------|
| X     | Not Applicable | Not Applicable |
| Basis |                |                |

Aldrin may cause adverse health effects in humans, specifically neurotoxicity to the central nervous system [a,b,c]. However, its occurrence in drinking water at frequencies or concentrations significant for public health concern is low; occurrence estimates from a cross-section of States with UCM data are very low with only 0.006% of all samples and 0.02% of PWSs showing detections where the HRL is 0.002 ug/L [d,e]. Furthermore, occurrence of aldrin in drinking water supplies is likely to decrease in the coming years, since the chemical is no longer produced or used commercially [f].

[a] Jager, 1970 [113]; [b] ACGIH, 1984 [6]; [c] ATSDR, 2000 [16]; [d] USEPA, 2001 [239]; [e] USEPA, 2001 [247]; [f] ATSDR, 1993 [1]; as cited in USEPA, 2001 [179]

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

Aldrin  
CCL 5 Contaminant Information Sheet  
HEALTH EFFECTS DATA

EPA-OGWDW and OST

July 2021

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value   | Units          | Assessment Source | Critical Study                        | Critical Effect                        | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                                                                                                                                                                    |
|------------------------------------|---------|----------------|-------------------|---------------------------------------|----------------------------------------|--------------------|-----------------------------|------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.00003 | mg/kg/day      | IRIS 1987         | Fitzhugh et al. 1964                  | liver toxicity (lesions)               | general population | 33.8                        | 0.178      | [190]                    |                                                                                                                                                                                                                                          |
| Reference Dose (RfD) or Equivalent | 0.00003 | mg/kg/day      | ATSDR 2002        | Fitzhugh et al. 1964                  | histopathological lesions in the liver | general population | 33.8                        | 0.178      | [18]                     |                                                                                                                                                                                                                                          |
| Reference Dose (RfD) or Equivalent | 0.00003 | mg/kg/day      | OW 2003           | Fitzhugh et al. 1964                  | histopathological lesions in the liver | general population | 33.8                        | 0.178      | [255]                    | NOTE: canceled registration, OPP does not provide a publicly-available health assessment for aldrin; no new information has been published by EPA regarding health effects of aldrin - refer to the 2003 RegDet supporting documentation |
| Cancer Slope Factor (CSF)          | 17      | (mg/kg/day)^-1 | IRIS 1987         | Davis, 1965; NCI, 1978                | liver carcinoma                        | general population | 33.8                        | 0.00174    | [190]                    |                                                                                                                                                                                                                                          |
| Cancer Slope Factor (CSF)          | 17      | (mg/kg/day)^-1 | OW 2003           | Davis, 1965; Epstein, 1975; NCI, 1978 | liver carcinoma                        | general population | 33.8                        | 0.00174    | [255]                    | NOTE: canceled registration, OPP does not provide a publicly-available health assessment for aldrin; no new information has been published by EPA regarding health effects of aldrin - refer to the 2003 RegDet supporting documentation |
| Cancer Classification (CC)         | B2      |                | IRIS 1987         |                                       |                                        |                    |                             |            | [190]                    |                                                                                                                                                                                                                                          |
| Cancer Classification (CC)         | B2      |                | OW 2003           |                                       |                                        |                    |                             |            | [255]                    | NOTE: canceled registration, OPP does not provide a publicly-available health assessment for aldrin; no new information has been published by EPA regarding health effects of aldrin - refer to the 2003 RegDet supporting documentation |
|                                    |         |                | OPP               |                                       |                                        |                    |                             |            |                          |                                                                                                                                                                                                                                          |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value         | Units          | Source                                | Notes |
|---------------------------------------------|---------------|----------------|---------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |               |                |                                       |       |
| 10-day Health Advisory                      | 0.0003        | mg/L           | EPA DWSHA 2018                        |       |
| Cancer Slope Factor (CSF)                   | 17            | (mg/kg/day)^-1 | CalEPA OEHHA Chemical Database        |       |
| Drinking Water Guideline Value              | 0.00003       | mg/L           | WHO Drinking Water Quality Guidelines |       |
| Human Health Ambient Water Quality Criteria | 7.7E-10       | mg/L           | EPA Human Health Criteria for CWA     |       |
| Inhalation Unit Risk (IUR)                  | 0.0049        | (ug/m3)^-1     | EPA IRIS                              |       |
| Inhalation Unit Risk (IUR)                  | 0.0049        | ug/m^3         | CalEPA OEHHA Chemical Database        |       |
| Lifetime Health Advisory                    | 0.000002      | mg/L           | EPA DWSHA 2018                        |       |
| Subchronic Provisional RfD                  | 0.00004       | mg/kg/day      | EPA PPRTV                             |       |
| Cancer Classification (CC)                  | 2A            | no units       | WHO IARC                              |       |
| Cancer Classification (CC)                  | Female.Mice N | no units       | HHS NTP                               |       |
| Cancer Classification (CC)                  | Female.Rats E | no units       | HHS NTP                               |       |
| Cancer Classification (CC)                  | Male.Mice P   | no units       | HHS NTP                               |       |
| Cancer Classification (CC)                  | Male.Rats E   | no units       | HHS NTP                               |       |

| Data Element                                      | Value | Units     | Source                  | Notes |
|---------------------------------------------------|-------|-----------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |       |           |                         |       |
| LD50                                              | 39    | mg/kg     | NIH HSDB                | min   |
| LD50                                              | 45    | mg/kg     | NIH HSDB                | max   |
| Percent of active toxicant in vitro assays tested | 30.45 | percent   | EPA Chemistry Dashboard |       |
| TD50                                              | 0.741 | mg/kg/day | NIH CPDB                | min   |
| TD50                                              | 466   | mg/kg/day | NIH CPDB                | max   |

| Data Element             | Value      | Units    | Source    | Notes |
|--------------------------|------------|----------|-----------|-------|
| <b>Modeled Data</b>      |            |          |           |       |
| LD50                     | 0.00010641 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.166      | no units | TEST QSAR |       |
| Developmental toxin test | 0.493      | no units | TEST QSAR |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
The full citation for the critical study is provided in the corresponding health assessment.  
PECO = Population, Exposure, Comparator, Outcome.

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Aldrin  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

July 2021

| Scoring Data                                                   |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 | 12,165                        | 2                 | Sites              | 0.02                 | 0.46                    | 0.575                  | 0.667                     | 0.69                    | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 192                           | 2                 | Sites              | 1.04                 | 0.0012                  | 0.0256                 | 0.0402                    | 0.05                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 84                            | 2                 | Sites              | 2.38                 | 0.0012                  | 0.0256                 | 0.0402                    | 0.05                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 108                           | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) | 7                | 15,373                     | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

| Non-Scoring Data                                                                       |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| <b>Finished Water</b>                                                                  |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 169                           | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - MA (Finished)                                         | 2006 - 2020 | 822                           | 1                 | Sites              | 0.12                 | 0.011                   | 0.011                  | 0.011                     | 0.011                   | ug/L        |       |
| Drinking Water Monitoring Data - WA (Finished)                                         | 2006 - 2011 | 660                           | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 10                            | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 1,551                         | 1                 | Sites              | 0.06                 | 0.084                   | 0.084                  | 0.084                     | 0.084                   | ug/L        |       |
| Drinking Water Monitoring Data - FL (Source)                                           | 2006 - 2011 | 1                             | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - MA (Source)                                           | 2006 - 2020 | 78                            | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - PA (Source)                                           | 2006 - 2011 | 3                             | 1                 | Sites              | 33                   | 0.044                   | 0.044                  | 0.044                     | 0.044                   | ug/L        |       |
| Drinking Water Monitoring Data - WA (Source)                                           | 2006 - 2011 | 738                           | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WI (Source)                                           | 2012-2019   | 92                            | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 126                           | 6                 | Sites              | 4.76                 | 0.0016                  | 0.011                  | 0.08                      | 0.207                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 297                           | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 423                           | 6                 | Sites              | 1.42                 | 0.0016                  | 0.011                  | 0.08                      | 0.207                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 123                           | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 113                           | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 10                            | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 94                            | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units              | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Exposure exposure                               |      | 0.00000127                              |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) | < LOD                        | ng/g  |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|----------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 363.235    | days                    |       |
| Boiling point                                                  | OPERA QSAR | 323.744    | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 355.96     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.0000876  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.0000577  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 7.58E-08   | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00000117 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 6522.68    | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 4017.91    | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.0000518  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 6.31366    | no units                |       |

**Aldrin**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                  |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                | Agency for Toxic Substances and Disease Registry (ATSDR). 1993. Toxicological Profile for Aldrin/Dieldrin (update). Atlanta: Agency for Toxic Substances and Disease Registry. 184 pp                                                                                                                                           |
| 6                | American Conference of Governmental Industrial Hygienists (ACGIH). 1984. Documentation of the Threshold Limit Values for Substances in Workroom Air. Third Edition. Cincinnati, OH: ACGIH. 139 pp.                                                                                                                              |
| 16               | ATSDR. 2000. Toxicological Profile for Aldrin/Dieldrin (Update). Atlanta, GA: Agency for Toxic Substances and Disease Registry. 280 pp.                                                                                                                                                                                         |
| 18               | ATSDR. 2002. Toxicological Profile for Aldrin/Dieldrin. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                                                             |
| 113              | Jager, K.W. 1970. Aldrin, Dieldrin, Endrin and Telodrin: An Epidemiological and Toxicological Study of Long-Term Occupational Exposure. New York: Elsevier Publishing Company. 234 pp.                                                                                                                                          |
| 179              | USEPA, 2001. Regulatory Determination Support Document for Aldrin and Dieldrin. EPA 815 R-01-011.                                                                                                                                                                                                                               |
| 190              | USEPA. 1987. Chemical Assessment Summary, Aldrin. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, DC.                                                                                                                                |
| 239              | USEPA. 2001. Analysis of National Occurrence of the 1998 Contaminant Candidate List Regulatory Determination Priority Contaminants in Public Water Systems. Office of Water. EPA report 815-D-01-002. 77 pp.                                                                                                                    |
| 247              | USEPA. 2001. Occurrence of Unregulated Contaminants in Public Water Systems: An Initial Assessment. Office of Water. EPA report 815-P-00-001. Office of Water. 50 pp.                                                                                                                                                           |
| 255              | USEPA. 2003. Contaminant Candidate List Regulatory Determination Support Document for Aldrin and Dieldrin. U.S Environmental Protection Agency, Office of Water, Standards and Risk Management Division, Washington, D.C.                                                                                                       |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society. |

**alpha-Hexachlorocyclohexane**  
CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                            |
|-----------------|------------------------------------------------------------|
| Name:           | alpha-Hexachlorocyclohexane                                |
| CASRN:          | 319-84-6                                                   |
| DTXSID:         | <a href="#">DTXSID2020684</a>                              |
| Use:            | Component of benzene hexachloride (BHC) former insecticide |
| Chemical Notes: |                                                            |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 4.6                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 6       | carcinogen with linear MOA | 5          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                               | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.005                  | hepatic nodules and hepatocellular carcinomas | general population | IRIS              | 1987                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0229                       | 90th Percentile                               | Finished Water                       | UCMR4  | 2018-2019 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

alpha-Hexachlorocyclohexane  
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**Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units                     | Assessment Source | Critical Study       | Critical Effect                                    | Target Population  | Exposure Factor (mL/kg-) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                                                                   |
|------------------------------------|-------|---------------------------|-------------------|----------------------|----------------------------------------------------|--------------------|--------------------------|------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.008 | mg/kg/day                 | ATSDR 2005        | Fitzhugh et al. 1950 | Hepatic effects: hepatic histopathological changes | general population | 33.8                     | 47.3       | [22]                     |                                                                                                                                         |
| Cancer Slope Factor (CSF)          | 6.3   | (mg/kg/day) <sup>-1</sup> | IRIS 1987         | Ito et al., 1973a    | hepatic nodules and hepatocellular carcinomas      | general population | 33.8                     | 0.00470    | [187]                    | NOTE: this compound is a byproduct of production of gamma HCH (Lindane), which is no longer registered for use as a pesticide in the US |
| Cancer Classification (CC)         | B2    |                           | IRIS 1987         |                      |                                                    |                    |                          |            | [187]                    | NOTE: this compound is a byproduct of production of gamma HCH (Lindane), which is no longer registered for use as a pesticide in the US |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|--------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                          |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                | Value      | Units                              | Source                            | Notes |
|---------------------------------------------|------------|------------------------------------|-----------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |            |                                    |                                   |       |
| Cancer Slope Factor (CSF)                   | 2.7        | (mg/kg/day) <sup>-1</sup>          | CalEPA OEHHA Chemical Database    |       |
| Human Health Ambient Water Quality Criteria | 0.00000036 | mg/L                               | EPA Human Health Criteria for CWA |       |
| Inhalation Unit Risk (IUR)                  | 0.0018     | (ug/m <sup>3</sup> ) <sup>-1</sup> | EPA IRIS                          |       |
| Inhalation Unit Risk (IUR)                  | 0.00077    | ug/m <sup>3</sup>                  | CalEPA OEHHA Chemical Database    |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 177   | mg/kg   | NIH HSDB                |       |
| Percent of active toxcast in vitro assays tested | 14.47 | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0012794 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.233     | no units | TEST QSAR |       |
| Developmental toxin test | 0.229     | no units | TEST QSAR |       |



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## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 | 3,649                         | 20                | Sites               | 0.55                 | 0.01                    | 0.0135                 | 0.0229                    | 0.067                   | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 8,230                         | 23                | Sites               | 0.28                 | 4.00E - 04              | 0.0118                 | 0.0646                    | 0.21                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 1,820                         | 20                | Sites               | 1.1                  | 4.00E - 04              | 0.0115                 | 0.067                     | 0.21                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 6,410                         | 3                 | Sites               | 0.05                 | 0.0012                  | 0.0327                 | 0.0511                    | 0.059                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                         | 2006 - 2020 | 34                            | 1                 | Sites               | 2.94                 | 0.012                   | 0.012                  | 0.012                     | 0.012                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Finished)                           | 2001 - 2013 | 6                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                           | 2006 - 2020 | 253                           | 1                 | Sites               | 0.4                  | 0.01                    | 0.01                   | 0.01                      | 0.01                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water)          | 2008 - 2017 | 242                           | 4                 | Sites               | 1.65                 | 0.01                    | 0.01                   | 0.02                      | 0.06                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)            | 2008 - 2017 | 725                           | 2                 | Sites               | 0.28                 | 0.0012                  | 0.0014                 | 0.00185                   | 0.0021                  | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)              | 2008 - 2017 | 967                           | 6                 | Sites               | 0.62                 | 0.0012                  | 0.01                   | 0.01                      | 0.06                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated) | 2001 - 2013 | 6                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                          | 2001 - 2013 | 6                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 0.00000102                              |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|----------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 18.5267    | days                    |       |
| Boiling point                                                  | OPERA QSAR | 236.373    | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 276.233    | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00355971 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.0106905  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00000849 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0000484  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 1506.74    | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 157.761    | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.00000734 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.66038    | no units                |       |

**alpha-Hexachlorocyclohexane**

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| Reference Number | Full Reference                                                                                                                                                                                                                                   |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 22               | ATSDR. 2005. Toxicological Profile for Alpha-, Beta-, Gamma-, and Delta-Hexachlorocyclohexane. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.       |
| 187              | USEPA. 1987. Chemical Assessment Summary alpha-Hexachlorocyclohexane (alpha-HCH); CASRN 319-84-6. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, DC. |

## Ametryn

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Ametryn                       |
| CASRN:          | 834-12-8                      |
| DTXSID:         | <a href="#">DTXSID1023869</a> |
| Use:            | Herbicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.000025                   |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 4       | non-cancer effects | 9          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                             | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 400                    | degenerative and inflammatory liver effects | general population | OPP               | 2017                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0101                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Ametryn

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                             | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|---------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.072 | mg/kg/day | OPP 2017          | O'Connor 1987  | degenerative and inflammatory liver effects | general population | 33.8                        | 426        | [376]                    |       |
| Cancer Classification (CC)         | S     |           | OPP 2017          |                |                                             |                    |                             |            | [376]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units | Source         | Notes |
|---------------------------------------------|-------|-------|----------------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |                |       |
| 10-day Health Advisory                      | 9     | mg/L  | EPA DWSHA 2018 |       |
| Lifetime Health Advisory                    | 0.06  | mg/L  | EPA DWSHA 2018 |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 3170      | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 508       | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 131       | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 20.9      | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 14        | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 2.5       | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 7.08      | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 36.099998 | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 7.6       | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0045604 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.207     | no units | TEST QSAR |       |
| Developmental toxin test | 0.608     | no units | TEST QSAR |       |

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| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.35089     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 343.891     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 360.753     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.00000211  | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.000000871 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000630959 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.00110662  | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 6.50043     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 5.28445     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 2.36E-08    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 2.94355     | no units                |       |

**Ametryn**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 376              | USEPA. 2017. Ametryn - Preliminary Human Health Risk Assessment for Registration Review. EPA-HQ-OPP-2013-0249-0022. DP No. D440785. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                     |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                    |

**Ammonia**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                |
|-----------------|----------------------------------------------------------------|
| Name:           | Ammonia                                                        |
| CASRN:          | 7664-41-7                                                      |
| DTXSID:         | <a href="#">DTXSID0023872</a>                                  |
| Use:            | Chemical intermediate; defoliant; antifungal agent for produce |
| Chemical Notes: |                                                                |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 |                            |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity | Prevalence | Magnitude |
|---------|----------|------------|-----------|
|         |          | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect | Target Pop. | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------|-------------|-------------------|----------------------|
|                                                          |                        |                 |             |                   |                      |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source        | Date        |
|------------------------------|-----------------------------------------------|--------------------------------------|---------------|-------------|
| 1748                         | 90th Percentile                               | Finished Water                       | DW Monitoring | 2006 - 2011 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Ammonia

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element               | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                              |
|----------------------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|--------------------------------------------------------------------|
| Cancer Classification (CC) | D     |       | OW 1992           |                |                 |                   |                             |            | [219]                    |                                                                    |
|                            |       |       | PPRTV 2005        |                |                 |                   |                             |            | [263]                    |                                                                    |
|                            |       |       | WHO 2003          |                |                 |                   |                             |            | [437]                    |                                                                    |
|                            |       |       | HC 2013           |                |                 |                   |                             |            | [100]                    | NOTE: All qualifying assessments decline to quantify oral toxicity |
|                            |       |       | ATSDR 2004        |                |                 |                   |                             |            | [19]                     |                                                                    |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Reproductive                | 10                          | Zhang, 2018        | Renal, Immune, Systemic      | 50                           | Zhang, 2018         | 2015-09-01           | 2020-03-25         | 4315                                           | 5                                               | 20                                             | 1                                                 |

## Other Health Data

| Data Element                                | Value | Units             | Source                         | Notes |
|---------------------------------------------|-------|-------------------|--------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |                   |                                |       |
| Acute inhalation Minimal Risk Level (MRL)   | 1.7   | ppm               | CDC ATSDR                      |       |
| Chronic inhalation Minimal Risk Level (MRL) | 0.1   | ppm               | CDC ATSDR                      |       |
| Lifetime Health Advisory                    | 30    | mg/L              | EPA DWSHA 2018                 |       |
| Reference Concentration (RfC)               | 0.5   | mg/m <sup>3</sup> | EPA IRIS                       |       |
| Reference Concentration (RfC)               | 200   | ug/m <sup>3</sup> | CalEPA OEHHA Chemical Database |       |
| Subchronic RfC                              | 0.1   | mg/m <sup>3</sup> | EPA PPRTV                      |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units | Source   | Notes |
|---------------------------------------------|-------|-------|----------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |          |       |
| LD50                                        | 350   | mg/kg | NIH HSDB |       |

| Data Element             | Value | Units | Source    | Notes |
|--------------------------|-------|-------|-----------|-------|
| <b>Modeled Data</b>      |       |       |           |       |
| LD50                     |       |       | TEST QSAR |       |
| Ames mutagenicity test   |       |       | TEST QSAR |       |
| Developmental toxin test |       |       | TEST QSAR |       |



Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Ammonia  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 10                            | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 10                            | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) | 50               | 158,252,384                | Chemical Data Reporting (CDR) Results (EPA) (2016) | 308 - 408                    |

Non-Scoring Data

| Non-Nationally Representative Water Data       | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WA (Finished) | 2006 - 2011 | 18                            | 7                 | Sites               | 39                   | 104                     | 1230                   | 1748                      | 2020                    | ug/L        |       |
| Glassmeyer et al 2017 (Finished) [86]          | 2007 - 2012 | 25                            | NA                | Sites               | 48                   |                         | 390                    |                           | 790                     | ug/L        |       |
| <b>Ambient Water</b>                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WA (Source)   | 2006 - 2011 | 13                            | 6                 | Sites               | 46                   | 19                      | 160                    | 1001                      | 1460                    | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]           | 2007 - 2012 | 25                            | NA                | Sites               | 64                   |                         | 50                     |                           | 240                     | ug/L        |       |
| <b>Waste Water Effluent</b>                    |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>        | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      |                                         |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

**Ammonia**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                  |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 19               | ATSDR. 2004. Toxicological Profile for Ammonia. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                                     |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. Science of The Total Environment. v581-582, (909-922). |
| 100              | Health Canada. 2013 Guideline Technical Document Ammonia. Health Canada (HC), Ottawa, Ontario, Canada.                                                                                                                                                                                          |
| 219              | USEPA. 1992. Drinking Water Health Advisories: Ammonia. U.S. Environmental Protection Agency, Office of Water, Health and Ecological Criteria Division, Washington, DC.                                                                                                                         |
| 263              | USEPA. 2005. Provisional Peer-Reviewed Toxicity Values for Ammonia. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH.                                     |
| 437              | WHO. 2003. Ammonia in Drinking-water. Background document for development of WHO Guidelines for Drinking-water Quality. World Health Organization (WHO), Geneva, Switzerland.                                                                                                                   |

**ANDROSTENEDIONE**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | ANDROSTENEDIONE               |
| CASRN:          | 63-05-8                       |
| DTXSID:         | <a href="#">DTXSID8024523</a> |
| Use:            |                               |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.000012                   |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 5       | reproductive and developmental effects | 9          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                               | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 100                    | hormone-related effects on male fertility (decreased number of sperm per mg cauda epididymis) | general population | ECHA              | 2011                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.00116                      | 90th Percentile                               | Finished Water                       | UCMR3  | 2013-2015 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**ANDROSTENEDIONE**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element                       | Value | Units     | Assessment Source | Critical Study                  | Critical Effect                                                                               | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                    |
|------------------------------------|-------|-----------|-------------------|---------------------------------|-----------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|--------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.025 | mg/kg/day | ECHA 2011         | NTP 2010; Blystone et al., 2011 | hormone-related effects on male fertility (decreased number of sperm per mg cauda epididymis) | general population | 33.8                        | 148                        | [70]                     | NOTE: An ECHA Derived No Effect Level (DNEL) is used in place of the RfD |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Developmental, Reproductive | 1                           | Sprando, 2004      | Systemic, Hepatic,           | 60                           | Wiesenfeld, 2006,   |                      | 2020-04-14         | 2928                                           | 10                                              | 18                                             | 6                                                 |

**Other Health Data**

| Data Element                                | Value          | Units    | Source  | Notes |
|---------------------------------------------|----------------|----------|---------|-------|
| <b>Measured Data and Assessment Results</b> |                |          |         |       |
| Cancer Classification (CC)                  | Female.Mice P  | no units | HHS NTP |       |
| Cancer Classification (CC)                  | Female.Rats EE | no units | HHS NTP |       |
| Cancer Classification (CC)                  | Male.Mice P    | no units | HHS NTP |       |
| Cancer Classification (CC)                  | Male.Rats EE   | no units | HHS NTP |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 1000  | mg/kg   | NIH HSDB                | max   |
| LD50                                             | 500   | mg/kg   | NIH HSDB                | min   |
| Percent of active toxcast in vitro assays tested | 14.15 | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0168267 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | -0.062    | no units | TEST QSAR |       |
| Developmental toxin test | 0.958     | no units | TEST QSAR |       |

## ANDROSTENEDIONE

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 | 1,201                         | 77                | Sites               | 6.41                 | 3.00E - 04              | 0.00047                | 0.00116                   | 0.0041                  | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 529                           | 7                 | Sites               | 1.32                 | 0.00041                 | 0.00088                | 0.00217                   | 0.00456                 | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 29                            | 6                 | Sites               | 21                   | 0.00041                 | 0.00072                | 0.00111                   | 0.00114                 | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 500                           | 1                 | Sites               | 0.2                  | 0.00456                 | 0.00456                | 0.00456                   | 0.00456                 | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 252                           | 30                | Sites               | 12                   | 0.00032                 | 0.00124                | 0.003                     | 0.00828                 | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 354                           | 3                 | Sites               | 0.85                 | 0.00225                 | 0.00238                | 0.00321                   | 0.00356                 | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 606                           | 33                | Sites               | 5.45                 | 0.00032                 | 0.00138                | 0.0032                    | 0.00828                 | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                            | 6                 | Sites               | 16                   | 0.001218                | 0.00283                | 0.00458                   | 0.006126                | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                       | 2013 - 2015 | 1,094                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                             | 2                 | Sites               | 100                  | 0.00046                 | 0.00059                | 0.000694                  | 0.00072                 | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                            | 19                | Sites               | 90                   | 0.000789                | 0.00209                | 0.00553                   | 0.007467                | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 0.00000022                              |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 58.1212     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 346.557     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 358.124     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000000234 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000000441 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000161292 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.000065    | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 37.295      | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 84.3335     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000000295 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.87316     | no units                |       |

**ANDROSTENEDIONE**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                          |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. Environmental Science and Technology 53: 2950-2960.                                                           |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. Environmental science & technology, 51(9), 4792-4802.                    |
| 70               | ECHA. 2011. Registration Dossier for Androst-4-ene-3,17-dione. European Chemicals Agency (ECHA), Helsinki, Finland. <a href="https://echa.europa.eu/registration-dossier/-/registered-dossier/13632/1">https://echa.europa.eu/registration-dossier/-/registered-dossier/13632/1</a> Accessed 5/14/2020. |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                      |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. Science of the Total Environment, 636, 69-79.                |

**Anthraquinone**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                        |                                                                                                               |
|------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>Name:</b>           | Anthraquinone                                                                                                 |
| <b>CASRN:</b>          | 84-65-1                                                                                                       |
| <b>DTXSID:</b>         | <a href="#">DTXSID3020095</a>                                                                                 |
| <b>Use:</b>            | Basis for the production of a large number of acid and base dyes, vat dyes, disperse dyes, and reactive dyes. |
| <b>Chemical Notes:</b> |                                                                                                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                                 |                                   |
|---------------------------------|-----------------------------------|
| <b>Draft CCL5 List Decision</b> | <b>Final Hazard Quotient (HQ)</b> |
| List                            | 0.36                              |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 4       | carcinogen with linear MOA | 9          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                               | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.8                    | increase in hepatocellular adenoma, carcinoma, or hepatoblastoma in male mice | general population | PPRTV             | 2011                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.284                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                          |
|--------------------------|
| <b>Public Nomination</b> |
|                          |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units          | Assessment Source | Critical Study | Critical Effect                                                                                     | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|----------------|-------------------|----------------|-----------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.002 | mg/kg/day      | PPRTV 2011        | NTP (2005b)    | pathology in several organs, including the liver, kidney, and spleen, in male and female F344 rats. | general population | 33.8                        | 11.8       | [323]                    |       |
| Cancer Slope Factor (CSF)          | 0.039 | (mg/kg/day)^-1 | PPRTV 2011        | NTP (2005b)    | The increase in hepatocellular adenoma, carcinoma, or hepatoblastoma in male mice                   | general population | 33.8                        | 0.759      | [323]                    |       |
| Cancer Classification (CC)         | L     |                | PPRTV 2011        |                |                                                                                                     |                    |                             |            | [323]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Immune, Renal               | 3.2                         | Dodd, 2013         | Whole Body, Hepatic          | 3.2                          | Dodd, 2013          | 2010-02-01           | 2020-01-15         | 847                                            | 1                                               | 1                                              | 1                                                 |

**Other Health Data**

| Data Element                                | Value         | Units     | Source    | Notes |
|---------------------------------------------|---------------|-----------|-----------|-------|
| <b>Measured Data and Assessment Results</b> |               |           |           |       |
| Subchronic Provisional RfD                  | 0.01          | mg/kg/day | EPA PPRTV |       |
| Cancer Classification (CC)                  | 2B            | no units  | WHO IARC  |       |
| Cancer Classification (CC)                  | Female.Mice P | no units  | HHS NTP   |       |
| Cancer Classification (CC)                  | Female.Rats P | no units  | HHS NTP   |       |
| Cancer Classification (CC)                  | Male.Mice P   | no units  | HHS NTP   |       |
| Cancer Classification (CC)                  | Male.Rats SE  | no units  | HHS NTP   |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 5000  | mg/kg   | NIH HSDB                |       |
| Percent of active toxcast in vitro assays tested | 1.28  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0150314 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.714     | no units | TEST QSAR |       |
| Developmental toxin test | 0.517     | no units | TEST QSAR |       |



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**OCCURRENCE DATA**

**Scoring Data**

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 567                           | 28                | Sites               | 4.94                 | 0.01                    | 0.05                   | 0.284                     | 0.78                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 88                            | 28                | Sites               | 32                   | 0.01                    | 0.05                   | 0.284                     | 0.78                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 479                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) | 10M - 50M                    |

**Non-Scoring Data**

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 716                           | 197               | Sites               | 28                   | 0.01                    | 0.05                   | 0.34                      | 2.98                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 690                           | 12                | Sites               | 1.74                 | 0.02                    | 0.05                   | 0.081                     | 0.11                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,406                         | 209               | Sites               | 15                   | 0.01                    | 0.05                   | 0.34                      | 2.98                    | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                            | 16                | Sites               | 42                   | 0.0128                  | 0.0346                 | 0.0522                    | 0.0782                  | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                            | 11                | Sites               | 52                   | 0.08                    | 0.081                  | 0.0818                    | 0.082                   | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Exposure exposure                               |      | 0.00000341                              |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 18.7227     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 371.769     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 357.578     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000000108 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000000198 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0000094   | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00000416  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 28.7099     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 101.158     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 6.82E-08    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.23488     | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                           |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.         |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                       |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.         |
| 323              | USEPA. 2011. Provisional Peer Reviewed Toxicity Values for 9,10-Anthraquinone(CASRN 84-65-1). EPA/690/R-11/007F. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH. |

**Atenolol**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                               |
|-----------------|-----------------------------------------------|
| Name:           | Atenolol                                      |
| CASRN:          | 29122-68-7                                    |
| DTXSID:         | <a href="#">DTXSID2022628</a>                 |
| Use:            | antihypertensive; antianginal; antiarrhythmic |
| Chemical Notes: |                                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.088                      |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 7       | non-cancer effects | 8          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 1                      | lowest therapeutic dose: beta blocker/blood pressure reduction | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.08778                      | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Atenolol

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value       | Units     | Assessment Source  | Critical Study                           | Critical Effect                                                | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                 |
|------------------------------------|-------------|-----------|--------------------|------------------------------------------|----------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.000208333 | mg/kg/day | FDA 2018; NIH 2018 | Caraco Pharmaceutical Laboratories, LTD. | lowest therapeutic dose: beta blocker/blood pressure reduction | bottle-fed infants | 151                         | 1.40                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 0.000208333 | mg/kg/day | FDA 2018; NIH 2018 | Caraco Pharmaceutical Laboratories, LTD. | lowest therapeutic dose: beta blocker/blood pressure reduction | general population | 33.8                        | 4.90                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                            | Value       | Units     | Source              | Notes |
|---------------------------------------------------------|-------------|-----------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |           |                     |       |
| Maximum Recommended Daily Dose                          | 3.33        | mg/kg/day | FDA                 |       |
| Screening level for pharmaceutical - general population | 0.004901961 | mg/L      | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.001388889 | mg/L      | EPA Office of Water |       |

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 2000  | mg/kg   | NIH HSDB                | min   |
| LD50                                             | 3000  | mg/kg   | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 0.7   | percent | EPA Chemistry Dashboard |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0089537 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.008     | no units | TEST QSAR |       |
| Developmental toxin test | 0.512     | no units | TEST QSAR |       |

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Atenolol  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 557                           | 12                | Sites              | 2.15                 | 0.00166                 | 0.0225                 | 0.0878                    | 0.249                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 75                            | 12                | Sites              | 16                   | 0.00166                 | 0.0225                 | 0.0878                    | 0.249                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 482                           | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                            | Date         | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------------|--------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                               |              |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                     |              | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Glassmeyer et al. 2017 (Finished) [86]                              | 2007 - 2012  | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Padhye et al. 2013 (Finished) [155]                                 | 2009 - 2010  | 8                             | 1                 | Samples             | 12                   | 0                       | 0                      |                           | 3.41e-05 +/- 0          | ug/L        |       |
| <b>Ambient Water</b>                                                |              |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                     |              | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)       | 2008 - 2017  | 205                           | 41                | Sites               | 20                   | 0.00096                 | 0.0194                 | 0.149                     | 0.515                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)         | 2008 - 2017  | 401                           | 3                 | Sites               | 0.75                 | 0.0081                  | 0.00869                | 0.00872                   | 0.00874                 | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)           | 2008 - 2017  | 606                           | 44                | Sites               | 7.26                 | 0.00096                 | 0.0179                 | 0.148                     | 0.515                   | ug/L        |       |
| Glassmeyer et al. 2017 (Ambient) [86]                               | 2007 - 2012  | 25                            | NA                | Sites               | 4                    |                         | 0.0298                 |                           | 0.0298                  | ug/L        |       |
| Batt et al. 2016 (Ambient) [46]                                     | 2008 - 2009  | 182                           | 88                | Sites               | 48                   | 0.0019                  | 0.0115                 | 0.0653                    | 0.1864                  | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                  | 2012 - 2014  | 38                            | 15                | Sites               | 39                   | 0.0079363               | 0.171                  | 0.422                     | 0.5510741               | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                             | 2013 - 2015  | 1,106                         | 1                 | Sites               | 0.09                 | 0.0087356               | 0.00874                | 0.00874                   | 0.0087356               | ug/L        |       |
| Padhye et al. 2013 (Ambient) [155]                                  | 2009 - 2010  | 8                             | 0                 | Samples             | 0                    | 0                       | 0                      |                           | 0                       | ug/L        |       |
| Batt et al. (2008) via Kostich et al. 2010 (Ambient) [127]          | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.035                   | ug/L        |       |
| Benotti et al. (2009) via Kostich et al. 2010 (Ambient) [127]       | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.036                   | ug/L        |       |
| Conkle et al. (2008) via Kostich et al. 2010 (Ambient) [127]        | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.02                    | ug/L        |       |
| Vanderford et al. (2006) via Kostich et al. 2010 (Ambient) [127]    | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.859                   | ug/L        |       |
| <b>Waste Water Effluent</b>                                         |              |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                     |              | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                                | 2011 - 2017  | 21                            | 21                | Sites               | 100                  | 0.0417468               | 0.579                  | 1.47                      | 3.233452                | ug/L        |       |
| Kostich et al. 2014 (Wastewater) [126]                              | not reported | 50                            | 48                | Sites               | 96                   | 0.0085                  | 0.596                  | 1.73                      | 3.0733                  | ug/L        |       |
| Batt et al. (2008) via Kostich et al. 2010 (Wastewater) [127]       | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.96                    | ug/L        |       |
| Conkle et al. (2008) via Kostich et al. 2010 (Wastewater) [127]     | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 1.442                   | ug/L        |       |
| Palmer et al. (2008) via Kostich et al. 2010 (Wastewater) [127]     | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 14.2                    | ug/L        |       |
| Vanderford et al. (2006) via Kostich et al. 2010 (Wastewater) [127] | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 3.06                    | ug/L        |       |
| <b>Estimated Concentration in Water</b>                             | <b>Date</b>  | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                     |              |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Exposcast exposure                              |      | 0.000000188                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value     | Units       | Notes |
|----------------------------------------------------------------|------------|-----------|-------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.34423   | days        |       |
| Boiling point                                                  | OPERA QSAR | 296.692   | degree C    |       |
| Boiling point                                                  | TEST QSAR  | 384.93    | degree C    |       |
| Vapor pressure                                                 | OPERA QSAR | 1.11E-09  | mmHg        |       |
| Vapor pressure                                                 | TEST QSAR  | 2.78E-08  | mmHg        |       |
| Solubility in water                                            | OPERA QSAR | 0.0489742 | mol/L       |       |
| Solubility in water                                            | TEST QSAR  | 0.0201372 | mol/L       |       |
| Bioconcentration factor                                        | OPERA QSAR | 1.41866   | no units    |       |
| Bioconcentration factor                                        | TEST QSAR  | 2.208     | no units    |       |
| Henry's Law constant                                           | OPERA QSAR | 4.35E-10  | atm-m^3/mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 0.0522496 | no units    |       |

**Atenolol**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                          |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 46               | Batt, A. L., Kincaid, T. M., Kostich, M. S., Lazorchak, J. M., & Olsen, A. R. (2016). Evaluating the extent of pharmaceuticals in surface waters of the United States using a National-scale Rivers and Streams Assessment survey. <i>Environmental toxicology and chemistry</i> , 35(4), 874-881.      |
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. <i>Environmental Science and Technology</i> 53: 2950-2960.                                                    |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.        |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                          |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922). |
| 126              | Kostich MS, et al. 2014 Concentrations of prioritized pharmaceuticals in effluents from 50 large wastewater treatment plants in the US and implications for risk estimation. <i>Environ Pollut</i> . 2014 Jan;184:354-9. doi: 10.1016/j.envpol.2013.09.013. Epub 2013 Oct 3. PMID: 24095705.            |
| 127              | Kostich, MS, et al., 2010. Predicting variability of aquatic concentrations of human pharmaceuticals. <i>Sci. Total Environ</i> . 408 (20), 4504e4510.                                                                                                                                                  |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                                     |
| 155              | Padhye, L.P., Yao, H., Kung'u, F.T., and Huang, C.H. Year-long evaluation on the occurrence and fate of pharmaceuticals, personal care products, and endocrine disrupting chemicals in an urban drinking water treatment plant. 2014. <i>Water Research</i> 51 (2014) 266-276.                          |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.        |

**Azoxystrobin**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Azoxystrobin                  |
| CASRN:          | 131860-33-8                   |
| DTXSID:         | <a href="#">DTXSID0032520</a> |
| Use:            | Agricultural fungicide        |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.000027                   |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 4       | non-cancer effects | 10         | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                   | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 1000                   | reduced body weights in both sexes and bile duct lesions in males | general population | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0265                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Azoxystrobin

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                                                   | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|-------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.18  | mg/kg/day | OPP 2018          | Milburn 1995   | reduced body weights in both sexes and bile duct lesions in males | general population | 33.8                        | 1070       | [396]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2018          |                |                                                                   |                    |                             |            | [396]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 4.5   | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.67  | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 1.2   | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 1.2   | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.18  | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 5000  | mg/kg     | NIH HSDB                        |       |
| LOAEL                                            | 25    | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 500   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 150   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 22.3  | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 21.17 | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 211   | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 250   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 22.4  | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 50    | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value    | Units    | Source    | Notes |
|--------------------------|----------|----------|-----------|-------|
| <b>Modeled Data</b>      |          |          |           |       |
| LD50                     | 0.001052 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.199    | no units | TEST QSAR |       |
| Developmental toxin test | 0.961    | no units | TEST QSAR |       |



Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
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EPA - Office of Water

Azoxystrobin

CCL 5 Contaminant Information Sheet

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**OCCURRENCE DATA**

**Scoring Data**

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,763                         | 263               | Sites              | 15                   | 0.00012                 | 0.00323                | 0.0265                    | 2.91                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 324                           | 253               | Sites              | 78                   | 0.00012                 | 0.00323                | 0.0265                    | 2.91                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,439                         | 10                | Sites              | 0.69                 | 0.00036                 | 0.00121                | 0.0144                    | 0.26                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 48               | 2,436,869                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

**Non-Scoring Data**

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 10                            | 8                 | Sites               | 80                   | 0.0013                  | 0.0032                 | 0.0375                    | 0.39                    | ug/L        |       |
| Bradley et al. 2018 (Finished) [53]                                                    | 2016        | 26                            | 1                 | Sites               | 3.85                 | 0.0218                  | 0.0218                 | 0.0218                    | 0.0218                  | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 434                           | 186               | Sites               | 43                   | 0.00013                 | 0.0066                 | 0.141                     | 128                     | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 531                           | 6                 | Sites               | 1.13                 | 0.00061                 | 0.00169                | 0.00654                   | 0.0101                  | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 965                           | 192               | Sites               | 20                   | 0.00013                 | 0.00651                | 0.141                     | 128                     | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 227                           | 12                | Sites               | 5.29                 | 0.0013                  | 0.0013                 | 0.0196                    | 0.662                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 218                           | 3                 | Sites               | 1.38                 | 0.0044                  | 0.0084                 | 0.467                     | 0.662                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 10                            | 9                 | Sites               | 90                   | 0.0013                  | 0.0013                 | 0.0184                    | 0.24                    | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 676                           | 311               | Sites               | 46                   | 0.0033                  | 0.0332                 | 0.412                     | 2.67                    | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 9                 | Sites               | 24                   | 0.005                   | 0.0281                 | 0.252                     | 0.2795                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 584                           | 4                 | Sites               | 0.68                 | 4e-04                   | 0.0013                 | 0.00194                   | 0.002                   | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 2.46E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|----------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.28513    | days                    |       |
| Boiling point                                                  | OPERA QSAR | 359.001    | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 474.033    | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 1.89E-12   | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 9.42E-11   | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0000121  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00000154 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 12.6717    | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  |            |                         |       |
| Henry's Law constant                                           | OPERA QSAR | 3.48E-09   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.71667    | no units                |       |

**Azoxystrobin**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985.                                                                    |
| 396              | USEPA. 2018. Azoxystrobin: Revised Human Health Draft Risk Assessment for Registration Review. EPA-HQ-OPP-2009-0835-0043. DP No. D444164. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                               |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**Benfluralin**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                                      |
|-----------------|--------------------------------------------------------------------------------------|
| Name:           | Benfluralin                                                                          |
| CASRN:          | 1861-40-1                                                                            |
| DTXSID:         | <a href="#">DTXSID3023899</a>                                                        |
| Use:            | Pre-emergent dinitroaniline herbicide used to control grasses and other weed species |
| Chemical Notes: |                                                                                      |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.00037                    |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects | 8          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                  | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 30                     | increased histopathologic lesions of the kidneys | general population | OPP               | 2017                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.011                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Benfluralin

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study   | Critical Effect                                  | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|------------------|--------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.005 | mg/kg/day | OPP 2017          | Moore 1996, 1998 | increased histopathologic lesions of the kidneys | general population | 33.8                        | 29.6       | [377]                    |       |
| Cancer Classification (CC)         | S     |           | OPP 2017          |                  |                                                  |                    |                             |            | [377]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Chronic Human Health Benchmark              | 0.03  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.03  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.005 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 10000 | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 5000  | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 1000  | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 25    | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 475   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 5     | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 9.87  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 25    | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 5     | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0156315 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.608     | no units | TEST QSAR |       |
| Developmental toxin test | 1.142     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Benfluralin  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             |                               | Prevalence        |                    |                      |                         |                        | Magnitude                 |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             |                               | Prevalence        |                    |                      |                         |                        | Magnitude                 |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 10,167                        | 152               | Sites              | 1.5                  | 0.001                   | 0.004                  | 0.011                     | 0.205                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,044                         | 133               | Sites              | 6.51                 | 0.001                   | 0.0045                 | 0.012                     | 0.205                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 8,123                         | 19                | Sites              | 0.23                 | 0.001                   | 0.004                  | 0.008                     | 0.011                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 7                | 53,174                    | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 2                | 1,250                      | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               | Prevalence        |                     |                      |                         |                        | Magnitude                 |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               | Prevalence        |                     |                      |                         |                        | Magnitude                 |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 33                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 706                           | 22                | Sites               | 3.12                 | 0.001                   | 0.007                  | 0.019                     | 0.088                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 2,606                         | 18                | Sites               | 0.69                 | 0.001                   | 0.003                  | 0.0068                    | 0.014                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 3,311                         | 40                | Sites               | 1.21                 | 0.001                   | 0.005                  | 0.018                     | 0.088                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 149                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 139                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 1,268                         | 16                | Sites               | 1.26                 | 0.007                   | 0.0125                 | 0.203                     | 2.71                    | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 2                 | Sites               | 5.26                 | 2.04e-05                | 5.69e-05               | 8.61e-05                  | 9.34e-05                | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 106                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               | Prevalence        |                     |                      |                         |                        | Magnitude                 |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 0.000000121                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.54014     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 366.246     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 361.409     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.0000568   | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.00000446  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000000357 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00000164  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 941.493     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 234.963     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.0000487   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 5.26734     | no units                |       |

**Benfluralin**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 377              | USEPA. 2017. Benfluralin: Human Health Draft Risk Assessment for Registration Review. EPA-HQ-OPP-2011-0931-0039. DP No. D431028. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                        |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**Bensulide**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Bensulide                     |
| CASRN:          | 741-58-2                      |
| DTXSID:         | <a href="#">DTXSID9032329</a> |
| Use:            | Herbicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              | X |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 120                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 5       | reproductive and developmental effects | 7          | 6         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                     | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 8                      | inhibition of red blood cell cholinesterase in pups | bottle-fed infants | OPP               | 2016                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|------|
| 979                          |                                               | EDWC SW peak                         | OPP    | 2016 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Bensulide

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                                     | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|-----------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.006 | mg/kg/day | OPP 2016          | Barnett 2014   | inhibition of red blood cell cholinesterase in pups | bottle-fed infants | 151                         | 7.95       | [361]                    |       |
| Cancer Classification (CC)         | E     |           | OPP 2016          |                |                                                     |                    |                             |            | [361]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source   | Notes |
|---------------------------------------------|-------|-----------|----------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |          |       |
| Acute Human Health Benchmark                | 1     | mg/L      | EPA HHBP |       |
| Acute PAD                                   | 0.15  | mg/kg/day | EPA HHBP |       |
| Chronic Human Health Benchmark              | 0.03  | mg/L      | EPA HHBP |       |
| Population-Adjusted Dose (PAD)              | 0.005 | mg/kg/day | EPA HHBP |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 1540  | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 270   | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 4     | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 95    | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 0.5   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 23    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 24.56 | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 1     | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 15    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 5     | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0004446 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.636     | no units | TEST QSAR |       |
| Developmental toxin test | 0.742     | no units | TEST QSAR |       |



## Bensulide

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 9                | 710,457                      | 2016 | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects                                      | Minimum Conc.<br>(Detects)                                                                                                                                                                                                                                                                    | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                                     |                      |                        |                                                              |                                                                                                                                                                                                                                                                                               |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                                                              |                                                                                                                                                                                                                                                                                               |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                                                              |                                                                                                                                                                                                                                                                                               |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                                                   |             |                                     |                      |                        |                                                              |                                                                                                                                                                                                                                                                                               |                           |                              |                            |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 544                                 | 320                  | Sites                  | 59                                                           | 0.02                                                                                                                                                                                                                                                                                          | 0.69                      | 6.38                         | 142                        | ug/L        |       |
|                                                                                        |             |                                     |                      |                        |                                                              |                                                                                                                                                                                                                                                                                               |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                                     |                      |                        |                                                              |                                                                                                                                                                                                                                                                                               |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                                                              |                                                                                                                                                                                                                                                                                               |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                                                              |                                                                                                                                                                                                                                                                                               |                           |                              |                            |             |       |
| <b>Estimated Concentration in Water</b>                                                | Date        | Source                              | Value                | Units                  | Model                                                        | Notes                                                                                                                                                                                                                                                                                         |                           |                              |                            |             |       |
| Estimated Drinking Water Concentration (EDWC) in Surface Water, Peak                   | 2016        | OPP                                 | 979                  | ug/L                   | Tier II Surface Water Concentration Calculator (SWCC) v1.106 | The critical effect of cholinesterase inhibition in postnatal day 11 pups is considered a less-than-chronic response in a sensitive population. To be protective of this population, the modeled surface water peak concentration was selected as the occurrence concentration for bensulide. |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expcast exposure                                   |      | 0.000000142                                   |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 104.45      | days                    |       |
| Boiling point                                                     | OPERA QSAR | 394.639     | degree C                |       |
| Boiling point                                                     | TEST QSAR  |             |                         |       |
| Vapor pressure                                                    | OPERA QSAR | 0.000000972 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.00000121  | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0000651   | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0000385   | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 4.85073     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 13.4276     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.00000159  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 4.0814      | no units                |       |

**Bensulide**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                  |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 361              | USEPA. 2016. Bensulide: Human Health Risk Assessment to Support Registration Review. EPA-HQ-OPP-2008-0022-0019. DP No. D428598. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                      |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society. |

**Bentazon**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Bentazon                      |
| CASRN:          | 25057-89-0                    |
| DTXSID:         | <a href="#">DTXSID0023901</a> |
| Use:            | Former herbicide              |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision |  | Final Hazard Quotient (HQ) |  |
|--------------------------|--|----------------------------|--|
| Not List                 |  | 0.0007                     |  |

ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 4       | reproductive and developmental effects | 9          | 3         |

Health Reference Level (HRL) or CCL Screening Level (SL)

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                            | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 200                    | decreased pup body weight during lactation | bottle-fed infants | OPP               | 2014                 |

Conc. in water for HQ (ug/L)

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.14                         | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |
| Not Applicable |                |                |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Bentazon

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study    | Critical Effect                            | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|-------------------|--------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.15  | mg/kg/day | OPP 2014          | Suter et al. 1989 | decreased pup body weight during lactation | bottle-fed infants | 151                         | 199        | [335]                    |       |
| Cancer Classification (CC)         | E     |           | OPP 2014          |                   |                                            |                    |                             |            | [335]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                      | Value | Units | Source                           | Notes |
|---------------------------------------------------|-------|-------|----------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |       |       |                                  |       |
| 10-day Health Advisory                            | 0.3   | mg/L  | EPA DWSHA 2018                   |       |
| Acute Health-Based Guidance Value                 | 0.06  | mg/L  | MN DOH                           |       |
| Acute Health-Based Guidance Value                 | 0.4   | mg/L  | MN DOH                           |       |
| Chronic Health-Based Guidance Value               | 0.03  | mg/L  | MN DOH                           |       |
| Lifetime Health Advisory                          | 0.2   | mg/L  | EPA DWSHA 2018                   |       |
| Public Health Goal                                | 0.2   | mg/L  | CalEPA OEHHA Public Health Goals |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.05  | mg/L  | MN DOH                           |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 1139  | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 383.2 | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 13.1  | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 249   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 3.2   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 62    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 3.41  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 243.3 | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 86.1  | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value | Units    | Source    | Notes |
|--------------------------|-------|----------|-----------|-------|
| <b>Modeled Data</b>      |       |          |           |       |
| LD50                     |       |          | TEST QSAR |       |
| Ames mutagenicity test   |       |          | TEST QSAR |       |
| Developmental toxin test | 1.022 | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Bentazon  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                                |             | Prevalence                          |                      |                       |                         | Magnitude                  |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                                |             | Prevalence                          |                      |                       |                         | Magnitude                  |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 7,741                               | 470                  | Sites                 | 6.07                    | 0.00051                    | 0.0129                    | 0.14                         | 19                         | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 1,195                               | 273                  | Sites                 | 23                      | 0.00051                    | 0.0121                    | 0.12                         | 19                         | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 6,546                               | 197                  | Sites                 | 3.01                    | 0.00193                    | 0.06                      | 0.926                        | 11.5                       | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 41               | 2,631,678                    | 2016 | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                               | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|------------------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                                  |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                        |             | Prevalence                          |                      |                        |                         | Magnitude                  |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Finished)                         | 2006 - 2020 | 211                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                           | 2001 - 2013 | 17                                  | 8                    | Sites                  | 47                      | 3e-04                      | 0.0013                    | 0.00757                      | 0.1                        | ug/L        |       |
| <b>Ambient Water</b>                                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                        |             | Prevalence                          |                      |                        |                         | Magnitude                  |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Source)                           | 2006 - 2020 | 2,231                               | 3                    | Sites                  | 0.13                    | 4.6                        | 5.3                       | 8.42                         | 9.2                        | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water)          | 2008 - 2017 | 476                                 | 96                   | Sites                  | 20                      | 0.00117                    | 0.0104                    | 0.0772                       | 13.2                       | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)            | 2008 - 2017 | 1,059                               | 39                   | Sites                  | 3.68                    | 0.00601                    | 0.0354                    | 0.115                        | 4.49                       | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)              | 2008 - 2017 | 1,535                               | 135                  | Sites                  | 8.79                    | 0.00117                    | 0.0121                    | 0.0874                       | 13.2                       | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated) | 2001 - 2013 | 229                                 | 79                   | Sites                  | 34                      | 3e-04                      | 0.0013                    | 0.0098                       | 1.31                       | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                        | 2001 - 2013 | 219                                 | 72                   | Sites                  | 33                      | 3e-04                      | 0.00111                   | 0.0186                       | 1.31                       | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                          | 2001 - 2013 | 12                                  | 7                    | Sites                  | 58                      | 3e-04                      | 0.0014                    | 0.0097                       | 0.194                      | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                     | 2012 - 2014 | 38                                  | 5                    | Sites                  | 13                      | 0.0116                     | 0.0187                    | 0.0624                       | 0.088                      | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                      | 2012 - 2013 | 690                                 | 13                   | Sites                  | 1.88                    | 0.0019                     | 0.0216                    | 0.124                        | 0.398                      | ug/L        |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                     | 2002 - 2010 | 126                                 | 4                    | Samples                | 3.2                     |                            |                           |                              | 0.03                       | ug/L        |       |
| <b>Waste Water Effluent</b>                                            |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                        |             | Prevalence                          |                      |                        |                         | Magnitude                  |                           |                              |                            |             |       |
|                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water                                       | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg-<br>bw/day) | Notes |
|----------------------------------------------------|------|------------------------------------------------|-------|
| Expcast exposure                                   |      | 0.000000017                                    |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 4.9037      | days                    |       |
| Boiling point                                                     | OPERA QSAR | 303.93      | degree C                |       |
| Boiling point                                                     | TEST QSAR  |             |                         |       |
| Vapor pressure                                                    | OPERA QSAR | 0.000000943 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  |             |                         |       |
| Solubility in water                                               | OPERA QSAR | 0.00219058  | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0000541   | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 1.4173      | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  |             |                         |       |
| Henry's Law constant                                              | OPERA QSAR | 2.59E-10    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 2.10469     | no units                |       |

**Bentazon**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 335              | USEPA. 2014. Sodium Bentazon - Preliminary Human Health Risk Assessment for Registration Review. EPA-HQ-OPP-2010-0117. DP No. D417312. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                  |

**Benzophenone**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                          |
|-----------------|--------------------------------------------------------------------------|
| Name:           | Benzophenone                                                             |
| CASRN:          | 119-61-9                                                                 |
| DTXSID:         | <a href="#">DTXSID0021961</a>                                            |
| Use:            | Chemical intermediate used pesticide, fragrance, varnish, antihistamines |
| Chemical Notes: |                                                                          |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.00037                    |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 4       | non-cancer effects | 10         | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                    | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 300                    | increased renal tubule hyperplasia | general population | MDH               | 2019                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.112                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Benzophenone

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|--------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                          |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value | Units     | Assessment Source | Critical Study                    | Critical Effect                      | Target Population  | Exposure Factor (mL/kg-) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|-----------------------------------|--------------------------------------|--------------------|--------------------------|----------------------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.03  | mg/kg/day | ECHA 2018         | NTP 2006                          | "non-neoplastic kidney effects"      | general population | 33.8                     | 178                        | [67]                     |       |
| Reference Dose (RfD) or Equivalent | 0.053 | mg/kg/day | MDH 2019          | National Toxicology Program, 2006 | "Increased renal tubule hyperplasia" | general population | 33.8                     | 314                        | [146]                    |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects                                                      | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|-----------------------------------------------------------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Hepatic                     | 6.445                       | Hoshino, 2005      | Female Reproductive, Nervous System, Gastrointestinal, Musculoskeletal, Endocrine | 4199                         | Chhabra, 2000       |                      | 2020-01-28         | 1221                                           | 7                                               | 15                                             | 5                                                 |

## Other Health Data

| Data Element                                | Value          | Units    | Source   | Notes |
|---------------------------------------------|----------------|----------|----------|-------|
| <b>Measured Data and Assessment Results</b> |                |          |          |       |
| Cancer Classification (CC)                  | 2B             | no units | WHO IARC |       |
| Cancer Classification (CC)                  | Female.Mice SE | no units | HHS NTP  |       |
| Cancer Classification (CC)                  | Female.Rats    | no units | HHS NTP  |       |
| Cancer Classification (CC)                  | Male.Mice SE   | no units | HHS NTP  |       |
| Cancer Classification (CC)                  | Male.Rats SE   | no units | HHS NTP  |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 10000 | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 1900  | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 130   | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 8.776 | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 40.52 | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 5     | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 3.43  | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0262422 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.378     | no units | TEST QSAR |       |
| Developmental toxin test | 0.553     | no units | TEST QSAR |       |



## Benzophenone

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 556                           | 74                | Sites               | 13                   | 0.01                    | 0.04                   | 0.112                     | 0.4                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 86                            | 29                | Sites               | 34                   | 0.01                    | 0.04                   | 0.117                     | 0.33                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 470                           | 45                | Sites               | 9.57                 | 0.01                    | 0.06                   | 0.105                     | 0.4                     | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) | 1M - 10M                     |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 713                           | 243               | Sites               | 34                   | 0.01                    | 0.05                   | 0.13                      | 6.83                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 688                           | 89                | Sites               | 13                   | 0.01                    | 0.025                  | 0.076                     | 0.34                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,401                         | 332               | Sites               | 24                   | 0.01                    | 0.04                   | 0.12                      | 6.83                    | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                            | 12                | Sites               | 32                   | 0.0714                  | 0.184                  | 0.214                     | 0.221                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                             | 2                 | Sites               | 100                  |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                            | 20                | Sites               | 95                   | 0.051                   | 0.17                   | 0.34                      | 0.36                    | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 0.0000335                               |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.31313     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 306.491     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 303.142     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00114394  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000349945 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00063623  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00027227  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 25.7151     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 87.9023     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.0000011   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.27814     | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                          |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.        |
| 67               | Danish Environmental Protection Agency. 2018. Substance Evaluation Conclusion as required by REACH Article 48 and Evaluation Report for Benzophenone EC No 204-337-6 CAS No 119-61-9. Copenhagen, Denmark. EC No 204-337-6                                                                              |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922). |
| 146              | MDH. 2019 Toxicological Summary for Benzophenone. Minnesota Department of Health (MDH), Environmental Health Division, Health Risk Assessment Unit, St Paul, MN.                                                                                                                                        |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                      |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.        |

**Bifenthrin**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Bifenthrin                    |
| CASRN:          | 82657-04-3                    |
| DTXSID:         | <a href="#">DTXSID9020160</a> |
| Use:            | Insecticide                   |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.0012                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 5       | reproductive and developmental effects | 7          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect            | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 10                     | reduced locomotor activity | bottle-fed infants | OPP               | 2012                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0122                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Bifenthrin

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study       | Critical Effect            | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------------|----------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.01  | mg/kg/day | OPP 2012          | Wolansky et al. 2006 | reduced locomotor activity | bottle-fed infants | 151                         | 13.2       | [324]                    |       |
| Cancer Classification (CC)         | C     |           | OPP 2012          |                      |                            |                    |                             |            | [324]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 0.07  | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.01  | mg/kg/day | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.07  | mg/L      | Health-based screening levels from USGS |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 4450      | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 54.5      | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 16.299999 | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 2         | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 1         | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 7.4       | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 10.19     | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 5         | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 7.5       | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 2.5       | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 4.3       | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0001361 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.392     | no units | TEST QSAR |       |
| Developmental toxin test | 0.781     | no units | TEST QSAR |       |



**Bifenthrin**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 324              | USEPA. 2012. Bifenthrin: Human Health Risk Assessment to Support Section 3 New Uses for a Bed Bug Treatment, Grass Grown for Seed, Tolerances for Imported Tea, and a Section 18 Emergency Exemption Use on Apple, Nectarine, and Peach. EPA-HQ-OPP-2016-0236-0007. DP No. D372550. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                     |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**Bisphenol A (4,4'-Isopropylidenediphenol)**

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July 2021

**CONTAMINANT IDENTIFYING INFORMATION**

|                        |                                                                              |
|------------------------|------------------------------------------------------------------------------|
| <b>Name:</b>           | Bisphenol A (4,4'-Isopropylidenediphenol)                                    |
| <b>CASRN:</b>          | 80-05-7                                                                      |
| <b>DTXSID:</b>         | <a href="#">DTXSID7020182</a>                                                |
| <b>Use:</b>            | Production of polycarbonate and epoxy resins.<br>Formerly used as fungicide. |
| <b>Chemical Notes:</b> |                                                                              |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 | X |

**CONTAMINANT SUMMARY & DECISION**

|                                 |                                   |
|---------------------------------|-----------------------------------|
| <b>Draft CCL5 List Decision</b> | <b>Final Hazard Quotient (HQ)</b> |
| List                            | 0.067                             |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects | 8          | 5         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                           | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 20                     | hepatocyte hypertrophy and increased liver weight (absolute and relative) | general population | ECHA              | 2015                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 1.6016                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                          |
|--------------------------|
| <b>Public Nomination</b> |
|                          |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Bisphenol A (4,4'-Isopropylidenediphenol)

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                                                                                | Value  | Units     | Assessment Source | Critical Study    | Critical Effect                                                                                                         | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L)                 | Assessment Full Citation | Notes                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------|--------|-----------|-------------------|-------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent                                                          | 0.05   | mg/kg/day | IRIS 1988         | NTP 1982          | "reduced mean bodyweight"                                                                                               | general population | 33.8                        | 296                        | [196]                    |                                                                                                                                                                                                                                                                                                         |
| <b>Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations</b> |        |           |                   |                   |                                                                                                                         |                    |                             |                            |                          |                                                                                                                                                                                                                                                                                                         |
| Data Element                                                                                | Value  | Units     | Assessment Source | Critical Study    | Critical Effect                                                                                                         | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                                                                                                                                                                                                   |
| Reference Dose (RfD) or Equivalent                                                          | 0.004  | mg/kg/day | ECHA 2015         | Tyl et al. 2008   | hepatocyte hypertrophy and increased liver weight (absolute and relative)                                               | general population | 33.8                        | 0.0237                     | [72]                     | NOTE: Due to the large amount of literature published after the 1988 IRIS assessment (an estimated 800 studies were expected to be relevant and require full text review), no additional searches are going to be taken at this time. If BPA is listed on the CCL, efforts to update EPA assessment may |
| Reference Dose (RfD) or Equivalent                                                          | 0.016  | mg/kg/day | NSF 2008          | Tyl et al. (2007) | reduced body weight gain in rats and minimal to mild hepatocyte hypertrophy in adult F0 and F1 males and F1 female mice | general population | 33.8                        | 94.7                       | [444]                    |                                                                                                                                                                                                                                                                                                         |
| Reference Dose (RfD) or Equivalent                                                          | 0.0065 | mg/kg/day | MDH 2015          | Tyl et al. 2008   | "Centrilobular hepatocyte hypertrophy, increased kidney weight"                                                         | general population | 33.8                        | 38.5                       | [138]                    |                                                                                                                                                                                                                                                                                                         |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review                                                                                                                                                           |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                             |                             |                    |                              |                              |                     | 1987-09-01           | 2019-12-17         | 9149                                           | 230                                             | 20                                             | Screening stopped in the middle of title/abstract screening due to extremely high number of includes, which was deemed outside the scope of this rapid systematic review. No further work on this chemical. |

## Other Health Data

| Data Element                                      | Value         | Units    | Source  | Notes |
|---------------------------------------------------|---------------|----------|---------|-------|
| <b>Measured Data and Assessment Results</b>       |               |          |         |       |
| Acute Health-Based Guidance Value                 | 0.1           | mg/L     | MN DOH  |       |
| Chronic Health-Based Guidance Value               | 0.02          | mg/L     | MN DOH  |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.02          | mg/L     | MN DOH  |       |
| Cancer Classification (CC)                        | Female.Mice   | no units | HHS NTP |       |
| Cancer Classification (CC)                        | Female.Rats E | no units | HHS NTP |       |
| Cancer Classification (CC)                        | Male.Mice E   | no units | HHS NTP |       |
| Cancer Classification (CC)                        | Male.Rats E   | no units | HHS NTP |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value   | Units     | Source                  | Notes |
|--------------------------------------------------|---------|-----------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |         |           |                         |       |
| LD50                                             | 2230    | mg/kg     | NIH HSDB                | min   |
| LD50                                             | 5280    | mg/kg     | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 21.33   | percent   | EPA Chemistry Dashboard |       |
| TD50                                             | 1320000 | mg/kg/day | NIH CPDB                | max   |
| TD50                                             | 445     | mg/kg/day | NIH CPDB                | min   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0179887 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.086     | no units | TEST QSAR |       |
| Developmental toxin test | 0.711     | no units | TEST QSAR |       |



Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Bisphenol A (4,4'-isopropylidenediphenol)

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

OCCURRENCE DATA

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 732                           | 12                | Sites              | 1.64                 | 0.03                    | 0.251                  | 1.6                       | 2.64                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 86                            | 4                 | Sites              | 4.65                 | 0.03                    | 0.105                  | 0.273                     | 0.278                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 646                           | 8                 | Sites              | 1.24                 | 0.107                   | 0.298                  | 2.13                      | 2.64                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) | 29               | 3,104,838                  | Chemical Data Reporting (CDR) Results (EPA) (2016) | 1B - 5B                      |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 1                             | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| Bradley et al. 2018 (Finished) [53]                           | 2016        | 26                            | 1                 | Sites              | 3.85                 | 9.157284                | 9.16                   | 9.16                      | 9.157284                | ug/L        |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                            | NA                | Sites              | 0                    |                         |                        |                           |                         | ug/L        |       |
| Padhye et al. 2013 (Finished) [155]                           | 2009 - 2010 | 8                             | 4                 | Samples            | 50                   | 0                       | 2.7e-06                |                           | 4.43e-05 +/- 1.01e-05   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                             | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 2                             | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,200                         | 205               | Sites              | 17                   | 0.01                    | 0.08                   | 0.49                      | 4.97                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 532                           | 157               | Sites              | 30                   | 0.01                    | 0.08                   | 0.464                     | 2.97                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 619                           | 47                | Sites              | 7.59                 | 0.02                    | 0.09                   | 1.05                      | 4.97                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,151                         | 204               | Sites              | 18                   | 0.01                    | 0.08                   | 0.49                      | 4.97                    | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                            | NA                | Sites              | 4                    |                         | 0.029                  |                           | 0.029                   | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                            | 15                | Sites              | 39                   | 0.0253                  | 0.0649                 | 0.134                     | 0.163                   | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                       | 2013 - 2015 | 1,077                         | 7                 | Sites              | 0.65                 | 0.171062                | 0.193                  | 0.34                      | 0.430036                | ug/L        |       |
| Padhye et al. 2013 (Ambient) [155]                            | 2009 - 2010 | 8                             | 6                 | Samples            | 75                   | 0                       | 1.27e-05               |                           | 2.19e-05 +/- 1.6e-06    | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                             | 2                 | Sites              | 100                  |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 20                            | 2                 | Sites              | 10                   | 0.152752                | 0.242                  | 0.401                     | 0.441148                | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>       | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.0000211                               |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) | 4.9                          | ug/l  |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units       | Notes |
|----------------------------------------------------------------|------------|-------------|-------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 15.1318     | days        |       |
| Boiling point                                                  | OPERA QSAR | 343.216     | degree C    |       |
| Boiling point                                                  | TEST QSAR  | 359.933     | degree C    |       |
| Vapor pressure                                                 | OPERA QSAR | 6.83E-08    | mmHg        |       |
| Vapor pressure                                                 | TEST QSAR  | 0.00000259  | mmHg        |       |
| Solubility in water                                            | OPERA QSAR | 0.000535206 | mol/L       |       |
| Solubility in water                                            | TEST QSAR  | 0.00124451  | mol/L       |       |
| Bioconcentration factor                                        | OPERA QSAR | 43.6947     | no units    |       |
| Bioconcentration factor                                        | TEST QSAR  | 117.22      | no units    |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000000126 | atm-m^3/mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.35076     | no units    |       |

**Bisphenol A (4,4'-Isopropylidenediphenol)**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                  |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. <i>Environmental Science and Technology</i> 53: 2950-2960.                                                                                                            |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985. |
| 72               | ECHA. 2015. Committee for Risk Assessment (RAC) Opinion on an Annex XV dossier proposing restrictions on bisphenol A. European Chemicals Agency (ECHA), Helsinki, Finland. ECHA/RAC/RES-O-0000001412-86-56/F.                                                                                                                                                   |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922).                                                         |
| 138              | MDH. 2015. Toxicological Summary for: Bisphenol A. Minnesota Department of Health (MDH), Environmental Health Division, Health Risk Assessment Unit, St Paul, MN.                                                                                                                                                                                               |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                              |
| 155              | Padhye, L.P., Yao, H., Kung'u, F.T., and Huang, C.H. Year-long evaluation on the occurrence and fate of pharmaceuticals, personal care products, and endocrine disrupting chemicals in an urban drinking water treatment plant. 2014. <i>Water Research</i> 51 (2014) 266-276.                                                                                  |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                                                                |
| 196              | USEPA. 1988. Chemical Assessment Summary Bisphenol A. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, DC.                                                                                                                                                            |
| 444              | Willhite, C., Ball, G., and McLellan, C. 2008. <i>Journal of Toxicology and Environmental Health, Part B</i> . 11:69-146.                                                                                                                                                                                                                                       |

**Boron**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                                 |
|-----------------|---------------------------------------------------------------------------------|
| Name:           | Boron                                                                           |
| CASRN:          | 7440-42-8                                                                       |
| DTXSID:         | <a href="#">DTXSID3023922</a>                                                   |
| Use:            | Former pesticide; oxygen scavenger; catalyst; in composite structural materials |
| Chemical Notes: |                                                                                 |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.48                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 4       | reproductive and developmental effects | 10         | 10        |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect              | Target Pop.               | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------|---------------------------|-------------------|----------------------|
| HRL                                                      | 1000                   | decreased fetal body weights | women of childbearing age | OW                | 2008                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 475                          | 90th Percentile                               | Finished Water                       | NIRS   | 1984-1986 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2 | RD 3           |
|----------------|------|----------------|
| Not Applicable | X    | Not Applicable |
| Basis          |      |                |

Boron was found at levels greater than the HRL (and ½ the HRL) in several of the ground water systems surveyed by NIRS, it was not found at levels greater than the HRL (or ½ the HRL) in the surface waters sources evaluated in the AwwaRF study [a, b, d]. EPA believes that the overall national occurrence and exposure from both surface and ground water systems together is likely to be lower than the values observed for the NIRS ground water data [c,d].

[a] Frey, et al, 2004 [82]; [b] Seidel, 2006 [162]; [c] USEPA, 2004 [261]; [d] USEPA, 2008 [298]; as cited in USEPA, 2008 [296]

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

Boron  
CCL 5 Contaminant Information Sheet  
HEALTH EFFECTS DATA  
EPA-OGWDW and OST  
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## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study                                                | Critical Effect                               | Target Population         | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|---------------------------------------------------------------|-----------------------------------------------|---------------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.035 | mg/kg/day | HC 1990           | Weir and Fisher 1972                                          | testicular atrophy and spermatogenesis arrest | general population        | 33.8                        | 207        | [90]                     |       |
| Reference Dose (RfD) or Equivalent | 0.17  | mg/kg/day | OW 2008           | Allen et al. 1996; Heindel et al. 1992; Price et al. 1994 and | decreased fetal body weights                  | women of childbearing age | 35.4                        | 960        | [292]                    |       |
| Reference Dose (RfD) or Equivalent | 0.2   | mg/kg/day | ATSDR 2010        | Weir and Fisher 1972                                          | testicular atrophy and systemic effects       | general population        | 33.8                        | 1180       | [28]                     |       |
| Reference Dose (RfD) or Equivalent | 0.17  | mg/kg/day | WHO 2009          | Allen et al. 1996; Heindel et al. 1992; Price et al. 1994 and | decreased fetal body weights                  | women of childbearing age | 35.4                        | 960        | [441]                    |       |
| Reference Dose (RfD) or Equivalent | 0.2   | mg/kg/day | IRIS 2004         | Price et al., 1996a; Heindel et al.,                          | decreased fetal weight                        | women of childbearing age | 35.4                        | 1130       | [259]                    |       |
| Cancer Classification (CC)         | I     |           | IRIS 2004         |                                                               |                                               |                           |                             |            | [259]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Reproductive                | 1                           | Marat, 2018        | Developmental, Systemic      | 125                          | El-Dakdoky, 2013    | 2009-11-01           | 2020-02-13         | 2877                                           | 9                                               | 30                                             | 4                                                 |

## Other Health Data

| Data Element                                      | Value | Units             | Source                                | Notes |
|---------------------------------------------------|-------|-------------------|---------------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |       |                   |                                       |       |
| 10-day Health Advisory                            | 3     | mg/L              | EPA DWSHA 2018                        |       |
| Acute Health-Based Guidance Value                 | 0.5   | mg/L              | MN DOH                                |       |
| Acute inhalation Minimal Risk Level (MRL)         | 0.3   | mg/m <sup>3</sup> | CDC ATSDR                             |       |
| Chronic Health-Based Guidance Value               | 0.5   | mg/L              | MN DOH                                |       |
| Drinking Water Guideline Value                    | 2.4   | mg/L              | WHO Drinking Water Quality Guidelines |       |
| Lifetime Health Advisory                          | 6     | mg/L              | EPA DWSHA 2018                        |       |
| Maximum Allowable Concentration (MAC)             | 5     | mg/L              | Canadian Drinking Water Guidelines    |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.5   | mg/L              | MN DOH                                |       |

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

| Data Element             | Value | Units | Source    | Notes |
|--------------------------|-------|-------|-----------|-------|
| <b>Modeled Data</b>      |       |       |           |       |
| LD50                     |       |       | TEST QSAR |       |
| Ames mutagenicity test   |       |       | TEST QSAR |       |
| Developmental toxin test |       |       | TEST QSAR |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
The full citation for the critical study is provided in the corresponding health assessment.  
PECO = Population, Exposure, Comparator, Outcome.

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Boron  
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OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 | 989                           | 810               | Sites              | 82                   | 5                       | 47                     | 475                       | 3950                    | ug/L        |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 6,327                         | 6,014             | Sites              | 95                   | 0                       | 38                     | 210                       | 8470                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 414                           | 388               | Sites              | 94                   | 0                       | 40                     | 193                       | 4200                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 5,913                         | 5,626             | Sites              | 95                   | 1                       | 33                     | 247                       | 8470                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) | 25K - 100K                   |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 273                           | 192               | Sites               | 70                   | 0.076                   | 180                    | 500                       | 9000                    | ug/L        |       |
| Community Water System Survey (CWSS) (Finished) [178]         | 2006        | 5                             | NA                | Sites               |                      |                         | 140                    | 200                       |                         | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 1,929                         | 1,184             | Sites               | 61                   | 0.0151                  | 240                    | 1000                      | 235000                  | ug/L        |       |
| Drinking Water Monitoring Data - WI (Source)                  | 2012-2019   | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 2,101                         | 1,959             | Sites               | 93                   | 1.79                    | 55                     | 301                       | 56700                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 8,067                         | 7,586             | Sites               | 94                   | 1                       | 65                     | 728                       | 564000                  | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 10,148                        | 9,526             | Sites               | 94                   | 1                       | 60                     | 467                       | 564000                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                             | 2012 - 2013 | 757                           | 738               | Sites               | 97                   | 3                       | 34                     | 446                       | 4080                    | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                              | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      |                                         |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 28               | ATSDR. 2010. Toxicological Profile for Boron. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                                                                                                                                                                          |
| 82               | Frey, M.M., C. Seidel, M. Edwards, J. Parks, and L. McNeill. 2004. Occurrence Survey for Boron and Hexavalent Chromium. AwwaRF Report 91044F.                                                                                                                                                                                                                                                                                      |
| 90               | HC. 1990. Guideline Technical Document - Boron. Health Canada (HC), Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Ottawa, Ontario, Canada.                                                                                                                                                                                                                                                        |
| 162              | Seidel, C. 2006. Email Communication to Brent Ranalli at The Cadmus Group, Inc. [concerning boron data from an AwwaRF-sponsored study, with data in an attached spreadsheet]. Denver, CO: McGuire Malcolm Pirnie. May 19.                                                                                                                                                                                                          |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                                                                                                                                                              |
| 259              | USEPA. 2004. Chemical Assessment Summary, Boron. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, D.C.                                                                                                                                                                                                                                   |
| 261              | USEPA. 2004. Integrated Risk Information System (IRIS), Boron and Compounds. August. Available on the Internet at: <a href="http://www.epa.gov/iris/subst/0410.htm">http://www.epa.gov/iris/subst/0410.htm</a> . Accessed February 2, 2005.                                                                                                                                                                                        |
| 292              | USEPA. 2008. Health Effects Support Document for Boron. U.S. Environmental Protection Agency, Office of Water, Health and Ecological Criteria Division, Washington, D.C.                                                                                                                                                                                                                                                           |
| 296              | USEPA. 2008. Regulatory Determinations Support Document for Selected Contaminants from the Second Drinking Water Contaminant Candidate List (CCL 2). EPA Report 815-R-08-012. June 2008.                                                                                                                                                                                                                                           |
| 298              | USEPA. 2008. The Analysis of Occurrence Data from the Unregulated Contaminant Monitoring (UCM) Program and National Inorganics and Radionuclides Survey (NIRS) in Support of Regulatory Determinations for the Second Drinking Water Contaminant Candidate List. EPA 815-D-08-014. June.                                                                                                                                           |
| 441              | WHO. 2009. Boron in Drinking-water. Background document for development of WHO Guidelines for Drinking-water Quality. World Health Organization (WHO), Geneva, Switzerland.                                                                                                                                                                                                                                                        |

**Boscalid**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Boscalid                      |
| CASRN:          | 188425-85-6                   |
| DTXSID:         | <a href="#">DTXSID6034392</a> |
| Use:            | Fungicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.000026                   |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 4       | non-cancer effects | 10         | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------|--------------------|-------------------|----------------------|
| HRL                                                      | 1000                   | thyroid lesions | general population | OPP               | 2019                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0258                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units     | Assessment Source | Critical Study                            | Critical Effect | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|-------------------------------------------|-----------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.22  | mg/kg/day | OPP 2019          | Mellert et al. 2001a and b; MRID 45723501 | thyroid lesions | general population | 33.8                        | 1300       | [414]                    |       |
| Cancer Classification (CC)         | S     |           | OPP 2019          |                                           |                 |                    |                             |            | [414]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Chronic Human Health Benchmark              | 1.4   | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 1.4   | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.218 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 5000      | mg/kg     | NIH HSDB                        |       |
| LOAEL                                            | 1034.5    | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 57.400002 | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 12.5      | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 300       | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 6.37      | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 78.099998 | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 788       | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 277       | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 8.1       | mg/kg/day | EPA Toxicity Reference Database | min   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0093325 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.516     | no units | TEST QSAR |       |
| Developmental toxin test | 0.762     | no units | TEST QSAR |       |



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OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 14                            | 3                 | Sites               | 21                   | 0.0057                  | 0.0102                 | 0.0258                    | 0.0288                  | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 14                            | 3                 | Sites               | 21                   | 0.0057                  | 0.0102                 | 0.0258                    | 0.0288                  | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 42               | 782,294                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                           | 2001 - 2013 | 5                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Bradley et al. 2018 (Finished) [53]                                    | 2016        | 26                            | 3                 | Sites               | 12                   | 0.0029                  | 0.0034                 | 0.00556                   | 0.0061                  | ug/L        |       |
| <b>Ambient Water</b>                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)          | 2008 - 2017 | 136                           | 70                | Sites               | 51                   | 0.0014                  | 0.0208                 | 0.215                     | 11.2                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)            | 2008 - 2017 | 3                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)              | 2008 - 2017 | 139                           | 70                | Sites               | 50                   | 0.0014                  | 0.0208                 | 0.215                     | 11.2                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated) | 2001 - 2013 | 221                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                        | 2001 - 2013 | 216                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                          | 2001 - 2013 | 5                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Bradley et al. 2017 (Ambient) [52]                                     | 2012 - 2014 | 38                            | 11                | Sites               | 29                   | 0.0052                  | 0.009                  | 0.215                     | 0.6781                  | ug/L        |       |
| <b>Waste Water Effluent</b>                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 1.82E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value     | Units                   | Notes |
|----------------------------------------------------------------|------------|-----------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.73188   | days                    |       |
| Boiling point                                                  | OPERA QSAR | 396.769   | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 446.25    | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 5.4E-09   | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 1.04E-08  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000026  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0000553 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 776.451   | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 107.152   | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 2.84E-09  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.15332   | no units                |       |

**Boscalid**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                  |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985. |
| 414              | USEPA. 2019. Boscalid. Human Health Risk Assessment for Registration Review. EPA-HQ-OPP-2014-0199-0020. DP No. D451675. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                              |

**Bromacil**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Bromacil                      |
| CASRN:          | 314-40-9                      |
| DTXSID:         | <a href="#">DTXSID4022020</a> |
| Use:            | Herbicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.0012                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 9          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                      | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 100                    | decreases in mean absolute body weight and decreased food efficiency | general population | OPP               | 2016                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.12                         | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Bromacil

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study | Critical Effect                                                      | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|----------------|----------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0196 | mg/kg/day | OPP 2016          | Bogdanffy 1989 | decreases in mean absolute body weight and decreased food efficiency | general population | 33.8                        | 116        | [362]                    |       |
| Cancer Classification (CC)         | C      |           | OPP 2016          |                |                                                                      |                    |                             |            | [362]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units | Source         | Notes |
|---------------------------------------------|-------|-------|----------------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |                |       |
| 10-day Health Advisory                      | 5     | mg/L  | EPA DWSHA 2018 |       |
| Lifetime Health Advisory                    | 0.07  | mg/L  | EPA DWSHA 2018 |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 5200      | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 641       | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 300       | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 9.8199997 | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 100       | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 2.64      | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 2.9       | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0047643 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.514     | no units | TEST QSAR |       |
| Developmental toxin test | 0.87      | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
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EPA - Office of Water

Bromacil  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 7,914                         | 482               | Sites               | 6.09                 | 0.00043                 | 0.0124                 | 0.12                      | 21.7                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 1,235                         | 268               | Sites               | 22                   | 0.00055                 | 0.0117                 | 0.095                     | 5.42                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 6,680                         | 214               | Sites               | 3.2                  | 0.00043                 | 0.05                   | 0.956                     | 21.7                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 3                | 253,973                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 174                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 15                            | 4                 | Sites               | 27                   | 0.0086                  | 0.045                  | 0.0654                    | 0.069                   | ug/L        |       |
| Glassmeyer et al 2017 (Finished) [86]                                                  | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 2,117                         | 1                 | Sites               | 0.05                 | 1.5                     | 1.5                    | 1.5                       | 1.5                     | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 227                           | 53                | Sites               | 23                   | 0.002                   | 0.016                  | 0.179                     | 21.8                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 46                | Sites               | 21                   | 0.002                   | 0.0445                 | 1.8                       | 21.8                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 10                            | 7                 | Sites               | 70                   | 0.002                   | 0.014                  | 0.0573                    | 0.41                    | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 2,953                         | 100               | Sites               | 3.39                 | 0.027                   | 0.122                  | 2.22                      | 68                      | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                                                   | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 5                 | Sites               | 13                   | 0.02                    | 0.028                  | 0.0948                    | 0.1                     | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 32                | Sites               | 4.64                 | 4e-04                   | 0.0164                 | 1.07                      | 7.76                    | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                                                   | 2011 - 2017 | 21                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 8.46E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.35662     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 290.845     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 315.49      | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00178266  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000000402 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.324213    | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00179473  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 2.42732     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 3.5156      | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.00000138  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.07377     | no units                |       |

**Bromacil**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922).                                                                                                                            |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                                                                                                                                   |
| 362              | USEPA. 2016. Bromacil and its Lithium Salt - Draft Human Health Risk Assessment for Registration Review. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                                                |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**Bromoxynil**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Bromoxynil                    |
| CASRN:          | 1689-84-5                     |
| DTXSID:         | <a href="#">DTXSID3022162</a> |
| Use:            | Herbicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.73                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 5       | carcinogen with linear MOA | 6          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect       | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.3                    | hepatocellular tumors | general population | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.22                         | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Bromoxynil

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units                     | Assessment Source | Critical Study               | Critical Effect                                                   | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|---------------------------|-------------------|------------------------------|-------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.015 | mg/kg/day                 | OPP 2018          | Harling et al. 1988 and 1989 | increased incidence of panting and decreased absolute body weight | general population | 33.8                        | 88.8       | [397]                    |       |
| Cancer Slope Factor (CSF)          | 0.103 | (mg/kg/day) <sup>~1</sup> | OPP 2018          | Budd and Rinde 1997          | hepatocellular tumors                                             | general population | 33.8                        | 0.287      | [397]                    |       |
| Cancer Classification (CC)         | C     |                           | OPP 2018          |                              |                                                                   |                    |                             |            | [397]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value    | Units                     | Source                                  | Notes |
|---------------------------------------------|----------|---------------------------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |          |                           |                                         |       |
| Acute Human Health Benchmark                | 0.5      | mg/L                      | EPA HHBP                                |       |
| Acute PAD                                   | 0.08     | mg/kg/day                 | EPA HHBP                                |       |
| Cancer Slope Factor (CSF)                   | 0.103    | (mg/kg/day) <sup>~1</sup> | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.000311 | mg/L                      | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.096    | mg/L                      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.000311 | mg/L                      | Health-based screening levels from USGS |       |
| Health-Based Screening Level                | 0.096    | mg/L                      | Health-based screening levels from USGS |       |
| Maximum Allowable Concentration (MAC)       | 0.005    | mg/L                      | Canadian Drinking Water Guidelines      |       |
| Population-Adjusted Dose (PAD)              | 0.015    | mg/kg/day                 | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 365   | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 63    | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 1.5   | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 12    | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 0.3   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 3.7   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 14.48 | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0011535 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.367     | no units | TEST QSAR |       |
| Developmental toxin test |           |          | TEST QSAR |       |



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Draft Fifth Contaminant Candidate List (CCL 5)  
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Bromoxynil  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 7,736                         | 60                | Sites              | 0.78                 | 6.00E - 04              | 0.0228                 | 0.22                      | 6.1                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 1,196                         | 53                | Sites              | 4.43                 | 6.00E - 04              | 0.0235                 | 0.219                     | 6.1                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 6,540                         | 7                 | Sites              | 0.11                 | 0.01                    | 0.02                   | 0.121                     | 0.311                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 36               | 2,957,908                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 2                | 31                         | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                           | 2001 - 2013 | 13                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)          | 2008 - 2017 | 476                           | 9                 | Sites               | 1.89                 | 0.0056                  | 0.01                   | 0.19                      | 0.269                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)            | 2008 - 2017 | 1,059                         | 1                 | Sites               | 0.09                 | 0.01                    | 0.01                   | 0.01                      | 0.01                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)              | 2008 - 2017 | 1,535                         | 10                | Sites               | 0.65                 | 0.0056                  | 0.01                   | 0.182                     | 0.269                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated) | 2001 - 2013 | 8                             | 1                 | Sites               | 12                   | 0.065                   | 0.065                  | 0.065                     | 0.065                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                        | 2001 - 2013 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                          | 2001 - 2013 | 6                             | 1                 | Sites               | 17                   | 0.065                   | 0.065                  | 0.065                     | 0.065                   | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                     | 2012 - 2014 | 38                            | 4                 | Sites               | 11                   | 0.0128                  | 0.0194                 | 0.0902                    | 0.1185                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                      | 2012 - 2013 | 690                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Exposure exposure                               |      | 0.000000092                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.8868      | days                    |       |
| Boiling point                                                  | OPERA QSAR | 306.681     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 295.87      | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000000232 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000264241 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000863573 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.000237684 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 5.7625      | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 12.331      | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000000153 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.62395     | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 397              | USEPA. 2018. Bromoxynil and Bromoxynil Esters: Human Health Draft Risk Assessment for Registration Review. EPA-HQ-OPP-2012-0896-0021. DP No. D444387. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                   |

**Bupropion**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Bupropion                     |
| CASRN:          | 34911-55-2                    |
| DTXSID:         | <a href="#">DTXSID7022706</a> |
| Use:            | antidepressant                |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.013                      |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects | 8          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                    | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 8                      | lowest therapeutic dose: aminoketone antidepressant/ maintaining antidepressant response, treat depressive episode | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.10344                      | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element                       | Value   | Units     | Assessment Source  | Critical Study          | Critical Effect                                                                                                    | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                 |
|------------------------------------|---------|-----------|--------------------|-------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.00125 | mg/kg/day | FDA 2018; NIH 2018 | Solco Healthcare US LLC | lowest therapeutic dose: aminoketone antidepressant/ maintaining antidepressant response, treat depressive episode | bottle-fed infants | 151                         | 8.30                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 0.00125 | mg/kg/day | FDA 2018; NIH 2018 | Solco Healthcare US LLC | lowest therapeutic dose: aminoketone antidepressant/ maintaining antidepressant response, treat depressive episode | general population | 33.8                        | 29.0                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                            | Value       | Units     | Source              | Notes |
|---------------------------------------------------------|-------------|-----------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |           |                     |       |
| Maximum Recommended Daily Dose                          | 7.5         | mg/kg/day | FDA                 |       |
| Screening level for pharmaceutical - general population | 0.029411765 | mg/L      | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.008333333 | mg/L      | EPA Office of Water |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units | Source   | Notes |
|---------------------------------------------|-------|-------|----------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |          |       |
| LD50                                        | 575   | mg/kg | NIH HSDB | min   |
| LD50                                        | 600   | mg/kg | NIH HSDB | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0045709 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.071     | no units | TEST QSAR |       |
| Developmental toxin test | 0.358     | no units | TEST QSAR |       |

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**Scoring Data**

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 557                           | 11                | Sites               | 1.97                 | 0.00107                 | 0.0139                 | 0.103                     | 0.148                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 75                            | 11                | Sites               | 15                   | 0.00107                 | 0.0139                 | 0.103                     | 0.148                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 482                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

**Non-Scoring Data**

| Non-Nationally Representative Water Data                        | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|-----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Finished) [86]                           | 2007 - 2012 | 25                            | NA                | Sites               | 12                   |                         | 0.0103                 |                           | 0.01091                 | ug/L        |       |
| <b>Ambient Water</b>                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)   | 2008 - 2017 | 205                           | 47                | Sites               | 23                   | 6.00E - 04              | 0.00403                | 0.2                       | 0.339                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)     | 2008 - 2017 | 401                           | 4                 | Sites               | 1                    | 0.00282                 | 0.0162                 | 0.0284                    | 0.034                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)       | 2008 - 2017 | 606                           | 51                | Sites               | 8.42                 | 6.00E - 04              | 0.00467                | 0.198                     | 0.339                   | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                            | 2007 - 2012 | 25                            | NA                | Sites               | 20                   |                         | 0.00636                |                           | 0.00941                 | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                              | 2012 - 2014 | 38                            | 12                | Sites               | 32                   | 0.0007854               | 0.048                  | 0.0796                    | 0.1595924               | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                         | 2013 - 2015 | 1,106                         | 3                 | Sites               | 0.27                 | 0.0044212               | 0.0093                 | 0.02                      | 0.0226803               | ug/L        |       |
| <b>Waste Water Effluent</b>                                     |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                            | 2011 - 2017 | 21                            | 18                | Sites               | 86                   | 0.0179911               | 0.0935                 | 0.988                     | 89.4629985              | ug/L        |       |
| Shultz et al. (2008) via Kostich et al. 2010 (Wastewater) [127] | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.6                     | ug/L        |       |
| <b>Estimated Concentration in Water</b>                         | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                 |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      |                                         |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.38965     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 307.696     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 295.443     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00000469  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.0000116   | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000646695 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.000368978 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 69.189      | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 50.3501     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 3.04E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 1.91432     | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                          |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. <i>Environmental Science and Technology</i> 53: 2950-2960.                                                    |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.        |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                          |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922). |
| 127              | Kostich, MS, et al., 2010. Predicting variability of aquatic concentrations of human pharmaceuticals. <i>Sci. Total Environ.</i> 408 (20), 4504e4510.                                                                                                                                                   |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                                     |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.        |

**Butyl benzyl phthalate**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                    |
|-----------------|------------------------------------|
| Name:           | Butyl benzyl phthalate             |
| CASRN:          | 85-68-7                            |
| DTXSID:         | <a href="#">DTXSID3020205</a>      |
| Use:            | Chemical intermediate; plasticizer |
| Chemical Notes: |                                    |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.065                      |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 3       | carcinogen with linear MOA | 9          | 7         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                            | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 20                     | increased incidence of pancreatic cancer in male F334 rats | general population | PPRTV             | 2002                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 1.3                          | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Butyl benzyl phthalate

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units                     | Assessment Source | Critical Study | Critical Effect                                                                  | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|---------------------------|-------------------|----------------|----------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.2    | mg/kg/day                 | IRIS 1989         | NTP 1985       | "Significantly increased liver- to-body weight and liver-to-brain weight ratios" | general population | 33.8                        | 1180       | [203]                    |       |
| Reference Dose (RfD) or Equivalent | 0.2    | mg/kg/day                 | OW 1991           | NTP 1985       | increased liver weight in rats                                                   | general population | 33.8                        | 1180       | [211]                    |       |
| Cancer Slope Factor (CSF)          | 0.0019 | (mg/kg/day) <sup>-1</sup> | PPRTV 2002        | NTP 1997a      | increased incidence of pancreatic cancer in male F334 rats                       | general population | 33.8                        | 15.6       | [253]                    |       |
| Cancer Classification (CC)         | C      |                           | OW 1991           |                |                                                                                  |                    |                             |            | [211]                    |       |
| Cancer Classification (CC)         | C      |                           | PPRTV 2002        |                |                                                                                  |                    |                             |            | [253]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Neurological, Systemic      | 2                           | Betz, 2013         | Hematologic                  | 1500                         | Uriu-Adams, 2001    | 2001-10-01           | 2019-12-17         | 656                                            | 12                                              | 34                                             | 11                                                |

## Other Health Data

| Data Element                                      | Value          | Units    | Source                            | Notes |
|---------------------------------------------------|----------------|----------|-----------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |                |          |                                   |       |
| Acute Health-Based Guidance Value                 | 0.1            | mg/L     | MN DOH                            |       |
| Acute Health-Based Guidance Value                 | 0.1            | mg/L     | MN DOH                            |       |
| Cancer Classification (CC)                        | 3              | no units | WHO IARC                          |       |
| Chronic Health-Based Guidance Value               | 0.1            | mg/L     | MN DOH                            |       |
| Human Health Ambient Water Quality Criteria       | 0.0001         | mg/L     | EPA Human Health Criteria for CWA |       |
| Maximum Allowable Daily Level                     | 1200           | ug/day   | CalEPA OEHHA Chemical Database    |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.1            | mg/L     | MN DOH                            |       |
| Cancer Classification (CC)                        | Female.Mice N  | no units | HHS NTP                           |       |
| Cancer Classification (CC)                        | Female.Mice NT | no units | HHS NTP                           |       |
| Cancer Classification (CC)                        | Female.Rats EE | no units | HHS NTP                           |       |
| Cancer Classification (CC)                        | Female.Rats P  | no units | HHS NTP                           |       |
| Cancer Classification (CC)                        | Male.Mice N    | no units | HHS NTP                           |       |
| Cancer Classification (CC)                        | Male.Mice NT   | no units | HHS NTP                           |       |
| Cancer Classification (CC)                        | Male.Rats IS   | no units | HHS NTP                           |       |
| Cancer Classification (CC)                        | Male.Rats SE   | no units | HHS NTP                           |       |

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 13750 | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 2000  | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 100   | mg/kg/day | EPA Toxicity Reference Database |       |
| Percent of active toxcast in vitro assays tested | 9.87  | percent   | EPA Chemistry Dashboard         |       |
| TD50                                             | 347   | mg/kg/day | NIH CPDB                        | min   |
| TD50                                             | 47000 | mg/kg/day | NIH CPDB                        | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0591562 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.035     | no units | TEST QSAR |       |
| Developmental toxin test | 0.749     | no units | TEST QSAR |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.



Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

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EPA - Office of Water

Butyl benzyl phthalate

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**OCCURRENCE DATA**

**Scoring Data**

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 22                            | 2                 | Sites               | 9.09                 | 1.3                     | 1.3                    | 1.3                       | 1.3                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 13                            | 2                 | Sites               | 15                   | 1.3                     | 1.3                    | 1.3                       | 1.3                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) | 10M - 50M                    |

**Non-Scoring Data**

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 21                            | 1                 | Sites               | 4.76                 | 0.005                   | 0.029                  | 0.0674                    | 0.077                   | ug/L        |       |
| Drinking Water Monitoring Data - WA (Finished)                | 2006 - 2011 | 484                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 221                           | 2                 | Sites               | 0.9                  | 0.003                   | 0.042                  | 5.41                      | 8.5                     | ug/L        |       |
| Drinking Water Monitoring Data - WA (Source)                  | 2006 - 2011 | 638                           | 1                 | Sites               | 0.16                 | 4.7                     | 5.2                    | 5.6                       | 5.7                     | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 143                           | 15                | Sites               | 10                   | 0.2                     | 0.8                    | 5                         | 5                       | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 344                           | 17                | Sites               | 4.94                 | 0.5                     | 0.8                    | 1.11                      | 2.1                     | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 487                           | 32                | Sites               | 6.57                 | 0.2                     | 0.8                    | 5                         | 5                       | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.000115                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|----------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.35267    | days                    |       |
| Boiling point                                                  | OPERA QSAR | 365.191    | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 392.394    | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00000447 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.00000433 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00000908 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0000185  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 19.3088    | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 16.6725    | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 2.82E-08   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 4.46009    | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                        |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 203              | USEPA. 1989. Chemical Assessment Summary Butyl benzyl phthalate. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, DC.                                                                                                                       |
| 211              | USEPA. 1991. Drinking Water Criteria Document for Phthalic Acid Esters (PAES). U.S. Environmental Protection Agency, Office of Water, Health and Ecological Criteria Division, Washington, DC.                                                                                                                                        |
| 253              | USEPA. 2002. Provisional Peer Reviewed Toxicity Values for Butyl benzyl phthalate (CASRN 85-68-7) Derivation of a Carcinogenicity Assessment. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH. |

**Caffeine**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Caffeine                      |
| CASRN:          | 58-08-2                       |
| DTXSID:         | <a href="#">DTXSID0020232</a> |
| Use:            | CNS stimulant                 |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 | X |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 |                            |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity | Prevalence | Magnitude |
|---------|----------|------------|-----------|
|         |          | 10         | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect | Target Pop. | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------|-------------|-------------------|----------------------|
|                                                          |                        |                 |             |                   |                      |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.2782                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

Caffeine  
CCL 5 Contaminant Information Sheet  
HEALTH EFFECTS DATA

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## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                                                                                                      |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|              |       |       |                   |                |                 |                   |                             |            |                          | NOTE: Though there are over the-counter labels for caffeine, there are no FDA approved formulations for adults. For this reason, a health concentration was not developed. |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References Identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                            | Value       | Units     | Source              | Notes |
|---------------------------------------------------------|-------------|-----------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |           |                     |       |
| Cancer Classification (CC)                              | 3           | no units  | WHO IARC            |       |
| Maximum Recommended Daily Dose                          | 10          | mg/kg/day | FDA                 |       |
| Screening level for pharmaceutical - general population | 0.058823529 | mg/L      | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.016666667 | mg/L      | EPA Office of Water |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 127   | mg/kg   | NIH HSDB                | min   |
| LD50                                             | 230   | mg/kg   | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 7.84  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0011429 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.192     | no units | TEST QSAR |       |
| Developmental toxin test | 0.799     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

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Caffeine  
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OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 3,465                         | 417               | Sites              | 12                   | 0.0025                  | 0.046                  | 0.278                     | 15                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 341                           | 222               | Sites              | 65                   | 0.004                   | 0.0554                 | 0.325                     | 15                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 3,124                         | 195               | Sites              | 6.24                 | 0.0025                  | 0.01                   | 0.0384                    | 2.82                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) | 100K - 500K                  |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 58                            | 9                 | Sites               | 16                   | 0.051                   | 0.064                  | 0.17                      | 0.37                    | ug/L        |       |
| Bradley et al. 2018 (Finished) [53]                           | 2016        | 26                            | 1                 | Sites               | 3.85                 | 0.0589107               | 0.0589                 | 0.0589                    | 0.0589107               | ug/L        |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Community Water System Survey (CWSS) (Finished) [178]         | 2006        | 1                             | NA                | Sites               |                      |                         | 0.017                  | 0.017                     |                         | ug/L        |       |
| Padhye et al. 2013 (Finished) [155]                           | 2009 - 2010 | 8                             | 3                 | Samples             | 38                   | 0                       | 0                      |                           | 1.16e-05 +/- 7e-07      | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 266                           | 34                | Sites               | 13                   | 0.05                    | 0.19                   | 0.427                     | 1.5                     | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 1,019                         | 526               | Sites               | 52                   | 0.00583                 | 0.06                   | 0.322                     | 18                      | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 1,697                         | 69                | Sites               | 4.07                 | 0.005                   | 0.0323                 | 0.108                     | 0.267                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 2,715                         | 595               | Sites               | 22                   | 0.005                   | 0.06                   | 0.314                     | 18                      | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                            | NA                | Sites               | 12                   |                         | 0.0703                 |                           | 0.09089                 | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                            | 28                | Sites               | 74                   | 0.0068603               | 0.0874                 | 0.227                     | 1.275935                | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                             | 2012 - 2013 | 106                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Bexfield et al. 2019 (Groundwater) [49]                       | 2013 - 2015 | 1,106                         | 11                | Sites               | 0.99                 | 0.1254262               | 0.246                  | 0.974                     | 1.359395                | ug/L        |       |
| Padhye et al. 2013 (Ambient) [155]                            | 2009 - 2010 | 8                             | 4                 | Samples             | 50                   | 0                       | 2.7e-06                |                           | 1.59e-05 +/- 6e-07      | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                             | 2                 | Sites               | 100                  | 0.002                   | 0.0145                 | 0.0247                    | 0.025                   | ug/L        |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]            | 2002 - 2010 | 126                           | 40                | Samples             | 32                   |                         |                        |                           | 11.4                    | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                            | 21                | Sites               | 100                  | 0.0189615               | 0.14                   | 1.8                       | 3.1                     | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 0.0000242                               |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|----------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.52242    | days                    |       |
| Boiling point                                                  | OPERA QSAR | 286.771    | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 337.485    | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00000208 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.00000241 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.101085   | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.054325   | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 1.86426    | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 1.31522    | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.00000159 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | -0.119469  | no units                |       |

**Caffeine**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. Environmental Science and Technology 53: 2950-2960.                                                                                                                                                                                      |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. Environmental science & technology, 51(9), 4792-4802.                                                                                                                                               |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. Environmental science & technology, 52(23), 13972-13985.                                                                                |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. Science of The Total Environment. v581-582, (909-922).                                                                                                                                    |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 155              | Padhye, L.P., Yao, H., Kung'u, F.T., and Huang, C.H. Year-long evaluation on the occurrence and fate of pharmaceuticals, personal care products, and endocrine disrupting chemicals in an urban drinking water treatment plant. 2014. Water Research 51 (2014) 266-276.                                                                                                                                                            |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. Science of the Total Environment, 636, 69-79.                                                                                                                                           |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                                                                                                                                                              |

**Calcium**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                     |
|-----------------|---------------------------------------------------------------------|
| Name:           | Calcium                                                             |
| CASRN:          | 7440-70-2                                                           |
| DTXSID:         | <a href="#">DTXSID9050484</a>                                       |
| Use:            | Element, used in alloys and deoxidizer for copper, beryllium, steel |
| Chemical Notes: |                                                                     |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxics                                 |  |
| PubMed Neurotoxics                                |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 |                            |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity | Prevalence | Magnitude |
|---------|----------|------------|-----------|
|         |          | 10         | 10        |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect | Target Pop. | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------|-------------|-------------------|----------------------|
|                                                          |                        |                 |             |                   |                      |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 96865                        | 90th Percentile                               | Finished Water                       | NIRS   | 1984-1986 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                                               |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------------------------------------------------------------------------------------|
|              |       |       | HC 2019           |                |                 |                   |                             |            | [97]                     | NOTE: There is no evidence of adverse health effects from calcium in drinking water |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element                       | Value | Units  | Assessment Source | Critical Study | Critical Effect    | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|--------|-------------------|----------------|--------------------|--------------------|-----------------------------|----------------------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 2500  | mg/day | IOM 2010          |                | no adverse effects | general population | 2413                        | 207000                     | [111]                    |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

| Data Element             | Value | Units | Source    | Notes |
|--------------------------|-------|-------|-----------|-------|
| <b>Modeled Data</b>      |       |       |           |       |
| LD50                     |       |       | TEST QSAR |       |
| Ames mutagenicity test   |       |       | TEST QSAR |       |
| Developmental toxin test |       |       | TEST QSAR |       |



Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Calcium  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 | 989                           | 986               | Sites               | 100                  | 25                      | 37453                  | 96865                     | 1116000                 | ug/L        |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 12,127                        | 12,124            | Sites               | 100                  | 20                      | 37000                  | 94540                     | 5200000                 | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,626                         | 2,626             | Sites               | 100                  | 22                      | 33700                  | 82000                     | 5200000                 | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9,502                         | 9,499             | Sites               | 100                  | 20                      | 51800                  | 120000                    | 1940000                 | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) | 1M - 10M                     |

Non-Scoring Data

| Non-Nationally Representative Water Data              | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|-------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                 |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                       |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)        | 2006 - 2020 | 660                           | 653               | Sites               | 99                   | 100                     | 49000                  | 96000                     | 1.2e+08                 | ug/L        |       |
| Drinking Water Monitoring Data - MA (Finished)        | 2006 - 2020 | 549                           | 532               | Sites               | 97                   | 30                      | 17600                  | 49200                     | 481000                  | ug/L        |       |
| Drinking Water Monitoring Data - WA (Finished)        | 2006 - 2011 | 221                           | 215               | Sites               | 97                   | 780                     | 22000                  | 56950                     | 121000                  | ug/L        |       |
| Glassmeyer et al 2017 (Finished) [86]                 | 2007 - 2012 | 25                            | NA                | Sites               | 100                  |                         | 39300                  |                           | 78400                   | ug/L        |       |
| Community Water System Survey (CWSS) (Finished) [178] | 2006        | 11                            | NA                | Sites               |                      |                         | 30000                  | 95000                     |                         | ug/L        |       |
| <b>Ambient Water</b>                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                       |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)          | 2006 - 2020 | 5,442                         | 5,427             | Sites               | 100                  | 100                     | 43000                  | 121000                    | 1.3e+08                 | ug/L        |       |
| Drinking Water Monitoring Data - MA (Source)          | 2006 - 2020 | 88                            | 88                | Sites               | 100                  | 202                     | 27700                  | 52790                     | 539000                  | ug/L        |       |
| Drinking Water Monitoring Data - ME (Source)          | 2009        | 1                             | 1                 | Sites               | 100                  | 25000                   | 25000                  | 25000                     | 25000                   | ug/L        |       |
| Drinking Water Monitoring Data - PA (Source)          | 2006 - 2011 | 13                            | 13                | Sites               | 100                  | 2100                    | 45700                  | 103360                    | 197000                  | ug/L        |       |
| Drinking Water Monitoring Data - WA (Source)          | 2006 - 2011 | 344                           | 341               | Sites               | 99                   | 810                     | 24900                  | 66730                     | 140000                  | ug/L        |       |
| Drinking Water Monitoring Data - WI (Source)          | 2012-2019   | 147                           | 146               | Sites               | 99                   | 550                     | 53000                  | 94480                     | 3e+05                   | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                  | 2007 - 2012 | 25                            | NA                | Sites               | 100                  |                         | 38900                  |                           | 129000                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                     | 2012 - 2013 | 758                           | 757               | Sites               | 100                  | 42                      | 32600                  | 100400                    | 476000                  | ug/L        |       |
| <b>Waste Water Effluent</b>                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                       |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
|                                                       |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                      | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                       |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      |                                         |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. Science of The Total Environment. v581-582, (909-922).                                                                                                                                    |
| 97               | HC. 2019. Guidelines for Canadian Drinking Water Quality Summary Table. Health Canada (HC), Water and Air Quality Bureau, Health Environments and Consumer Safety Branch, Ottawa, Ontario, Canada.                                                                                                                                                                                                                                 |
| 111              | IOM. 2010. Dietary Reference Intakes for Calcium and Vitamin D. Institute of Medicine (IOM), National Academies of Science, Washington, D.C.                                                                                                                                                                                                                                                                                       |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                                                                                                                                                              |

**Camphor**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                                                                           |
|-----------------|---------------------------------------------------------------------------------------------------------------------------|
| Name:           | Camphor                                                                                                                   |
| CASRN:          | 76-22-2                                                                                                                   |
| DTXSID:         | <a href="#">DTXSID5030955</a>                                                                                             |
| Use:            | Starting reagent for organic synthesis. Used as an odorant and flavorant. Plasticizer in cosmetics and as a preservative. |
| Chemical Notes: |                                                                                                                           |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 |                            |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity | Prevalence | Magnitude |
|---------|----------|------------|-----------|
|         |          | 9          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect | Target Pop. | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------|-------------|-------------------|----------------------|
|                                                          |                        |                 |             |                   |                      |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0592                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                             |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-----------------------------------|
|              |       |       |                   |                |                 |                   |                             |            |                          | NOTE: No health assessments found |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      | 2020-04-07         | 1181                                           | 2                                               | 8                                              | 0                                                 |

**Other Health Data**

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 1310  | mg/kg   | NIH HSDB                |       |
| Percent of active toxcast in vitro assays tested | 0.43  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0098855 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | -0.018    | no units | TEST QSAR |       |
| Developmental toxin test | 0.94      | no units | TEST QSAR |       |

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OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 571                           | 28                | Sites               | 4.9                  | 0.004                   | 0.0125                 | 0.0592                    | 7.6                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 88                            | 25                | Sites               | 28                   | 0.004                   | 0.013                  | 0.0598                    | 7.6                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 483                           | 3                 | Sites               | 0.62                 | 0.004                   | 0.006                  | 0.0368                    | 0.05                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) | 100K - 500K                  |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Finished) [86]                                                  | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 721                           | 340               | Sites               | 47                   | 0.005                   | 0.03                   | 0.11                      | 3.9                     | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 692                           | 27                | Sites               | 3.9                  | 0.004                   | 0.028                  | 0.34                      | 1.08                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 1,413                         | 367               | Sites               | 26                   | 0.004                   | 0.03                   | 0.11                      | 3.9                     | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 15                            | 1                 | Sites               | 6.67                 | 0.105                   | 0.105                  | 0.105                     | 0.105                   | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                                                   | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 14                | Sites               | 37                   | 0.0108                  | 0.0214                 | 0.0415                    | 0.0486                  | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                                                   | 2011 - 2017 | 21                            | 8                 | Sites               | 38                   | 0.025                   | 0.045                  | 0.075                     | 0.13                    | ug/L        |       |
| <b>Estimated Concentration in Water</b>                                                | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.0000102                               |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|----------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 5.16263    | days                    |       |
| Boiling point                                                  | OPERA QSAR | 204.644    | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 203.784    | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.340707   | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.214289   | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00489575 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0111944  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 14.6711    | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 55.7186    | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.0000794  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.64083    | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                         |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                       |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922).                                |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                     |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                                       |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society. |

**Carbamazepine**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Carbamazepine                 |
| CASRN:          | 298-46-4                      |
| DTXSID:         | <a href="#">DTXSID4022731</a> |
| Use:            | analgesic; anticonvulsant     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 | X |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.013                      |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects | 9          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                         | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 6                      | lowest therapeutic dose: anticonvulsant/seizure therapy | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.07999                      | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Carbamazepine

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                                                                                | Value       | Units     | Assessment Source  | Critical Study                      | Critical Effect                                          | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L)                 | Assessment Full Citation | Notes                                                                                                     |
|---------------------------------------------------------------------------------------------|-------------|-----------|--------------------|-------------------------------------|----------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------|
| <b>Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations</b> |             |           |                    |                                     |                                                          |                    |                             |                            |                          |                                                                                                           |
| Data Element                                                                                | Value       | Units     | Assessment Source  | Critical Study                      | Critical Effect                                          | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                     |
| Reference Dose (RfD) or Equivalent                                                          | 0.000833333 | mg/kg/day | FDA 2018; NIH 2018 | Caraco Pharmaceutical Laboratories, | lowest therapeutic dose: anticonvulsant/ seizure therapy | bottle-fed infants | 151                         | 5.60                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved |
| Reference Dose (RfD) or Equivalent                                                          | 0.000833333 | mg/kg/day | FDA 2018; NIH 2018 | Caraco Pharmaceutical Laboratories, | lowest therapeutic dose: anticonvulsant/ seizure therapy | general population | 33.8                        | 20.0                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      | 2020-01-28         | 10463                                          |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                            | Value       | Units     | Source              | Notes |
|---------------------------------------------------------|-------------|-----------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |           |                     |       |
| Acute Health-Based Guidance Value                       | 0.04        | mg/L      | MN DOH              |       |
| Acute Health-Based Guidance Value                       | 0.04        | mg/L      | MN DOH              |       |
| Chronic Health-Based Guidance Value                     | 0.04        | mg/L      | MN DOH              |       |
| Maximum Recommended Daily Dose                          | 26.7        | mg/kg/day | FDA                 |       |
| Screening level for pharmaceutical - general population | 0.019607843 | mg/L      | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.005555556 | mg/L      | EPA Office of Water |       |
| Short-Term/Subchronic Health-Based Guidance Value       | 0.04        | mg/L      | MN DOH              |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| Percent of active toxcast in vitro assays tested | 2.19  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0068707 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.428     | no units | TEST QSAR |       |
| Developmental toxin test | 0.792     | no units | TEST QSAR |       |



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| Scoring Data                                                   |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 626                           | 62                | Sites              | 9.9                  | 0.00021                 | 0.00478                | 0.08                      | 0.468                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 75                            | 41                | Sites              | 55                   | 0.00021                 | 0.00475                | 0.0821                    | 0.334                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 551                           | 21                | Sites              | 3.81                 | 0.00033                 | 0.00495                | 0.0571                    | 0.468                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

| Non-Scoring Data                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Non-Nationally Representative Water Data                       | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                 | 2006 - 2020 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Bradley et al. 2018 (Finished) [53]                            | 2016        | 26                            | 2                 | Sites               | 7.69                 | 0.0005503               | 0.000656               | 0.00074                   | 0.0007611               | ug/L        |       |
| Glassmeyer et al 2017 (Finished) [86]                          | 2007 - 2012 | 25                            | NA                | Sites               | 8                    |                         | 0.0177                 |                           | 0.0265                  | ug/L        |       |
| Padhye et al. 2013 (Finished) [155]                            | 2009 - 2010 | 8                             | 1                 | Samples             | 12                   | 0                       | 0                      |                           | 2.5e-05 +/- 8.8e-06     | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                  | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Kleywegt et al. (2011) via Uslu et al. (2013) (Finished) [433] | 2011        | NA                            | NA                |                     |                      |                         |                        |                           | 0.601                   | ug/L        |       |
| Tabe et al. (2009) via Uslu et al. (2013) (Finished) [433]     | 2009        | NA                            | NA                |                     |                      |                         |                        |                           | 4e-04                   | ug/L        |       |
| Kormos et al. (2007) via Uslu et al. (2013) (Finished) [433]   | 2007        | NA                            | NA                |                     |                      |                         |                        |                           | 0.721                   | ug/L        |       |
| IL EPA (2008) via Uslu et al. (2013) (Finished) [433]          | 2008        | NA                            | NA                |                     |                      |                         |                        |                           | 0.007                   | ug/L        |       |
| Snyder et al. (2007) via Kumar et al. (2010) (Finished) [128]  | 2007        | 20                            | NA                | Samples             |                      | 0.0011                  | 0.0028                 |                           | 0.0057                  | ug/L        |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                   | 2006 - 2020 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)  | 2008 - 2017 | 502                           | 246               | Sites               | 49                   | 0.00018                 | 0.012                  | 0.114                     | 0.521                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)    | 2008 - 2017 | 940                           | 58                | Sites               | 6.17                 | 0.00046                 | 0.0157                 | 0.301                     | 1                       | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)      | 2008 - 2017 | 1,441                         | 304               | Sites               | 21                   | 0.00018                 | 0.012                  | 0.13                      | 1                       | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                           | 2007 - 2012 | 25                            | NA                | Sites               | 28                   |                         | 0.0159                 |                           | 0.0357                  | ug/L        |       |
| Batt et al. 2016 (Ambient) [46]                                | 2008 - 2009 | 182                           | 74                | Sites               | 41                   | 0.0015                  | 0.0116                 | 0.0514                    | 0.2493                  | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                             | 2012 - 2014 | 38                            | 22                | Sites               | 58                   | 0.0008717               | 0.0707                 | 0.204                     | 0.3827473               | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                        | 2013 - 2015 | 1,106                         | 18                | Sites               | 1.63                 | 0.0029133               | 0.00852                | 0.102                     | 0.1620862               | ug/L        |       |
| Padhye et al. 2013 (Ambient) [155]                             | 2009 - 2010 | 8                             | 8                 | Samples             | 100                  | 5e-07 +/- 1e-07         | 9e-07                  |                           | 4.1e-06 +/- 1.2e-06     | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                   | 2009 - 2010 | 2                             | 2                 | Sites               | 100                  | 0.001                   | 0.0055                 | 0.0122                    | 0.014                   | ug/L        |       |
| Kleywegt et al. (2011) via Uslu et al. (2013) (Ambient) [433]  | 2011        | NA                            | NA                |                     |                      |                         |                        |                           | 0.749                   | ug/L        |       |
| Tabe et al. (2009) via Uslu et al. (2013) (Ambient) [433]      | 2009        | NA                            | NA                |                     |                      |                         |                        |                           | 0.002                   | ug/L        |       |
| Kormos et al. (2007) via Uslu et al. (2013) (Ambient) [433]    | 2007        | NA                            | NA                |                     |                      |                         |                        |                           | 1.015                   | ug/L        |       |
| Rahman et al. (2010) via Uslu et al. (2013) (Ambient) [433]    | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.0779                  | ug/L        |       |
| IL EPA (2008) via Uslu et al. (2013) (Ambient) [433]           | 2008        | NA                            | NA                |                     |                      |                         |                        |                           | 0.009                   | ug/L        |       |
| Snyder et al. (2007) via Kumar et al. (2010) (Ambient) [128]   | 2007        | 20                            | NA                | Samples             |                      | 0.0012                  | 0.0031                 |                           | 0.039                   | ug/L        |       |
| Batt et al. (2008) via Kostich et al. 2010 (Ambient) [127]     | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.02                    | ug/L        |       |

|                                                    |      |                                         |       |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
| Expocast exposure                                  |      | 0.00000236                              |       |

  

|                                                     |                              |       |       |
|-----------------------------------------------------|------------------------------|-------|-------|
| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 5.03451     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 320.593     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 384.336     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 6.85E-10    | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 3.22E-08    | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000382424 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0000255   | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 16.3863     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 26.6073     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 1.02E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 2.46475     | no units                |       |

**Carbamazepine**

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|     |                                                                                                                                                                                                                                                                                                                                                                 |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                                                                                                                                                                                                                                                                 |
| 46  | Batt, A. L., Kincaid, T. M., Kostich, M. S., Lazorchak, J. M., & Olsen, A. R. (2016). Evaluating the extent of pharmaceuticals in surface waters of the United States using a National-scale Rivers and Streams Assessment survey. <i>Environmental toxicology and chemistry</i> , 35(4), 874-881.                                                              |
| 49  | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. <i>Environmental Science and Technology</i> 53: 2950-2960.                                                                                                            |
| 52  | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                |
| 53  | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985. |
| 77  | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                                                                                  |
| 86  | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922).                                                         |
| 126 | Kostich MS, et al. 2014 Concentrations of prioritized pharmaceuticals in effluents from 50 large wastewater treatment plants in the US and implications for risk estimation. <i>Environ Pollut</i> . 2014 Jan;184:354-9. doi: 10.1016/j.envpol.2013.09.013. Epub 2013 Oct 3. PMID: 24095705.                                                                    |
| 127 | Kostich, MS, et al., 2010. Predicting variability of aquatic concentrations of human pharmaceuticals. <i>Sci. Total Environ</i> . 408 (20), 4504e4510.                                                                                                                                                                                                          |
| 128 | Kumar, A. and Xagorarakis, I., 2010. Human health risk assessment of pharmaceuticals in water: An uncertainty analysis for meprobamate, carbamazepine, and phenytoin. <i>Regulatory Toxicology and Pharmacology</i> , 57(2-3), pp.146-156.                                                                                                                      |
| 150 | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                                                                                             |
| 153 | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                              |
| 155 | Padhye, L.P., Yao, H., Kung'u, F.T., and Huang, C.H. Year-long evaluation on the occurrence and fate of pharmaceuticals, personal care products, and endocrine disrupting chemicals in an urban drinking water treatment plant. 2014. <i>Water Research</i> 51 (2014) 266-276.                                                                                  |
| 161 | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                                                                |
| 433 | Uslu, M., Jasim, S., Arvai, A., Bewtra, J. and Biswas, N., 2013. A Survey of Occurrence and Risk Assessment of Pharmaceutical Substances in the Great Lakes Basin. <i>Ozone: Science &amp; Engineering</i> , 35(4), pp.249-262.                                                                                                                                 |

**Carbaryl**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                    |
|-----------------|------------------------------------|
| Name:           | Carbaryl                           |
| CASRN:          | 63-25-2                            |
| DTXSID:         | <a href="#">DTXSID9020247</a>      |
| Use:            | Insecticide; veterinary medication |
| Chemical Notes: |                                    |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 | X |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.24                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 5       | reproductive and developmental effects | 1          | 6         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                               | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 10                     | brain acetylcholinesterase inhibition in pups | bottle-fed infants | OPP               | 2017                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date        |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-------------|
| 2.4                          | 90th Percentile                               | Finished Water                       | UCM2   | 1993 - 1997 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Carbaryl

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value    | Units          | Assessment Source | Critical Study | Critical Effect                               | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|----------|----------------|-------------------|----------------|-----------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.01     | mg/kg/day      | OPP 2017          | Moser 2006     | brain acetylcholinesterase inhibition in pups | bottle-fed infants | 151                         | 13.2       | [378]                    |       |
| Cancer Slope Factor (CSF)          | 0.000875 | (mg/kg/day)^-1 | OPP 2017          | Hamada 1993    | hemangiosarcoma                               | general population | 33.8                        | 33.8       | [378]                    |       |
| Cancer Classification (CC)         | L        |                | OPP 2017          |                |                                               |                    |                             |            | [378]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units    | Source                             | Notes |
|---------------------------------------------|-------|----------|------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |          |                                    |       |
| 10-day Health Advisory                      | 1     | mg/L     | EPA DWSHA 2018                     |       |
| Cancer Classification (CC)                  | 3     | no units | WHO IARC                           |       |
| Lifetime Health Advisory                    | 0.04  | mg/L     | EPA DWSHA 2018                     |       |
| Maximum Allowable Concentration (MAC)       | 0.09  | mg/L     | Canadian Drinking Water Guidelines |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 128       | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 500       | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 1248.9301 | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 3.0999999 | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 180.86    | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 4         | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 11.51     | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0014689 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.655     | no units | TEST QSAR |       |
| Developmental toxin test | 0.784     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Carbaryl

CCL 5 Contaminant Information Sheet

OCCURRENCE DATA

EPA-OGWDW and OST

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 | 12,623                        | 4                 | Sites              | 0.03                 | 0.68                    | 1                      | 2.4                       | 3                       | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 11,274                        | 820               | Sites              | 7.27                 | 0.00038                 | 0.011                  | 0.074                     | 23.5                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,227                         | 750               | Sites              | 34                   | 0.00038                 | 0.011                  | 0.074                     | 23.5                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9,048                         | 70                | Sites              | 0.77                 | 0.00048                 | 0.0075                 | 0.0364                    | 0.781                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 43               | 1,981,350                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 9                | 872                        | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 171                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - MA (Finished)                                         | 2006 - 2020 | 820                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WA (Finished)                                         | 2006 - 2011 | 255                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 5                 | Sites               | 29                   | 0.002                   | 0.005                  | 0.069                     | 0.3                     | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 1,747                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - MA (Source)                                           | 2006 - 2020 | 77                            | 1                 | Sites               | 1.3                  | 0.75                    | 0.75                   | 0.75                      | 0.75                    | ug/L        |       |
| Drinking Water Monitoring Data - PA (Source)                                           | 2006 - 2011 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WA (Source)                                           | 2006 - 2011 | 422                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WI (Source)                                           | 2012-2019   | 92                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 1,564                         | 363               | Sites               | 23                   | 0.00089                 | 0.016                  | 0.135                     | 3.13                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 3,658                         | 24                | Sites               | 0.66                 | 0.00037                 | 0.007                  | 0.039                     | 0.0886                  | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 5,221                         | 387               | Sites               | 7.41                 | 0.00037                 | 0.015                  | 0.13                      | 3.13                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 7                 | Sites               | 3.06                 | 0.002                   | 0.018                  | 0.0643                    | 0.33                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 2                 | Sites               | 0.91                 | 0.0125                  | 0.02                   | 0.0511                    | 0.0612                  | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 5                 | Sites               | 42                   | 0.002                   | 0.018                  | 0.065                     | 0.33                    | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 9,207                         | 332               | Sites               | 3.61                 | 0.003                   | 0.11                   | 0.533                     | 13                      | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 11                | Sites               | 29                   | 0.0032                  | 0.0135                 | 0.0899                    | 0.257                   | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 796                           | 6                 | Sites               | 0.75                 | 5e-04                   | 6e-04                  | 0.0027                    | 0.0033                  | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                                     | 2002 - 2010 | 133                           | 35                | Samples             | 26                   |                         |                        |                           | 1.3                     | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                                                   | 2011 - 2017 | 21                            | 3                 | Sites               | 14                   | 0.093                   | 0.093                  | 0.093                     | 0.093                   | ug/L        |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                   |      | 5.61E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.55485     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 312.24      | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 311.019     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.00000118  | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.00000562  | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000534089 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000414954 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 10.3318     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 4.69894     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 1.55E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 2.38412     | no units                |       |

**Carbaryl**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                                                                                                                                   |
| 378              | USEPA. 2017. Carbaryl: Draft Human Health Risk Assessment in Support of Registration Review. EPA-HQ-OPP-2010-0230-0034. DP No. D433668. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                 |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**Carbendazim**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Carbendazim                   |
| CASRN:          | 10605-21-7                    |
| DTXSID:         | <a href="#">DTXSID4024729</a> |
| Use:            | Fungicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.0076                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 3       | carcinogen with linear MOA | 10         | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                         | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 10                     | hepatocellular adenoma and/or carcinoma | general population | OPP               | 2014                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.07612                      | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



## Carbendazim

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value   | Units                     | Assessment Source | Critical Study                   | Critical Effect                            | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|---------|---------------------------|-------------------|----------------------------------|--------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.025   | mg/kg/day                 | OPP 2014          | Sherman et al. 1972              | decreased body weight and food consumption | general population | 33.8                        | 148        | [337]                    |       |
| Cancer Slope Factor (CSF)          | 0.00239 | (mg/kg/day) <sup>-1</sup> | OPP 2014          | Wood 1982; Schneider et al. 1982 | hepatocellular adenoma and/or carcinoma    | general population | 33.8                        | 12.4       | [337]                    |       |
| Cancer Classification (CC)         | C       |                           | OPP 2014          |                                  |                                            |                    |                             |            | [337]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value   | Units                     | Source                                  | Notes |
|---------------------------------------------|---------|---------------------------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |         |                           |                                         |       |
| Acute Human Health Benchmark                | 0.11    | mg/L                      | EPA HHBP                                |       |
| Acute PAD                                   | 0.017   | mg/kg/day                 | EPA HHBP                                |       |
| Cancer Slope Factor (CSF)                   | 0.00239 | (mg/kg/day) <sup>-1</sup> | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.16    | mg/L                      | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.0134  | mg/L                      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.16    | mg/L                      | Health-based screening levels from USGS |       |
| Health-Based Screening Level                | 0.0134  | mg/L                      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.025   | mg/kg/day                 | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 15000     | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 5000      | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 16.540001 | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 90        | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 20        | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 7.19      | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 10.79     | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0082794 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.605     | no units | TEST QSAR |       |
| Developmental toxin test | 0.884     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Carbendazim

CCL 5 Contaminant Information Sheet

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**OCCURRENCE DATA**

**Scoring Data**

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,757                         | 212               | Sites               | 12                   | 0.00014                 | 0.014                  | 0.0761                    | 1.79                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 322                           | 198               | Sites               | 61                   | 0.00014                 | 0.014                  | 0.0759                    | 1.79                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,435                         | 14                | Sites               | 0.98                 | 0.00105                 | 0.0127                 | 0.13                      | 0.251                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

**Non-Scoring Data**

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 7                             | 1                 | Sites               | 14                   | 0.003                   | 0.003                  | 0.003                     | 0.003                   | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 115                           | 4                 | Sites               | 3.48                 | 0.003                   | 0.003                  | 0.033                     | 0.121                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 109                           | 1                 | Sites               | 0.92                 | 0.005                   | 0.005                  | 0.0153                    | 0.0179                  | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 7                             | 3                 | Sites               | 43                   | 0.003                   | 0.003                  | 0.033                     | 0.121                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 122                           | 33                | Sites               | 27                   | 0.0043                  | 0.0197                 | 0.0605                    | 0.1559                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 584                           | 5                 | Sites               | 0.86                 | 0.0013                  | 0.0054                 | 0.101                     | 0.157                   | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.00000001                              |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.54241     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 275.322     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 374.376     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 2.04E-09    | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 1.17E-08    | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0024081   | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.000907821 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 2.44925     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 1.6293      | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 1.38E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 1.43961     | no units                |       |

**Carbendazim**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 337              | USEPA. 2014. Thiophanate-Methyl and Carbendazim (MBC). Human Health Assessment Scoping Document in Support of Registration Review. EPA-HQ-OPP-2014-0004-0010. DP No. D413079. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                           |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                    |

**Carbon disulfide**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Name:           | Carbon disulfide                                                                        |
| CASRN:          | 75-15-0                                                                                 |
| DTXSID:         | <a href="#">DTXSID6023947</a>                                                           |
| Use:            | Former insecticide/fumigant; rubber additive; industrial solvent; chemical intermediate |
| Chemical Notes: |                                                                                         |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxics                                 | X |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.00067                    |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 4       | reproductive and developmental effects | 10         | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                        | Target Pop.               | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------|---------------------------|-------------------|----------------------|
| HRL                                                      | 600                    | fetal toxicity and fetal malformations | women of childbearing age | IRIS              | 1987                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.4                          | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Carbon disulfide

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study     | Critical Effect                        | Target Population         | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                                  |
|------------------------------------|-------|-----------|-------------------|--------------------|----------------------------------------|---------------------------|-----------------------------|------------|--------------------------|--------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.1   | mg/kg/day | IRIS 1987         | Hardin et al. 1981 | fetal toxicity and fetal malformations | women of childbearing age | 35.4                        | 565        | [191]                    | NOTE: high volatility and very low odor threshold: from 0.0243 mg/m3 to 23.1 mg/m3 (0.0078 to 7.4 ppm) |
|                                    |       |           | ATSDR 1996        |                    |                                        |                           |                             |            | [11]                     |                                                                                                        |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Systemic, Neurological      | 200                         | Gao, 2014          |                              |                              |                     | 1995-08-01           | 2020-02-13         | 528                                            | 10                                              | 71                                             | 2                                                 |

## Other Health Data

| Data Element                                | Value | Units     | Source                         | Notes |
|---------------------------------------------|-------|-----------|--------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                |       |
| Acute Minimal Risk Level (MRL)              | 0.01  | mg/kg/day | CDC ATSDR                      |       |
| Benchmark                                   | 0.16  | mg/L      | CalEPA OEHHA Chemical Database |       |
| Chronic Health-Based Guidance Value         | 0.7   | mg/L      | MN DOH                         |       |
| Chronic inhalation Minimal Risk Level (MRL) | 0.3   | ppm       | CDC ATSDR                      |       |
| Reference Concentration (RfC)               | 0.7   | mg/m^3    | EPA IRIS                       |       |
| Reference Concentration (RfC)               | 800   | ug/m^3    | CalEPA OEHHA Chemical Database |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 2125  | mg/kg   | NIH HSDB                | min   |
| LD50                                             | 3188  | mg/kg   | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 0.43  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value | Units    | Source    | Notes |
|--------------------------|-------|----------|-----------|-------|
| <b>Modeled Data</b>      |       |          |           |       |
| LD50                     |       |          | TEST QSAR |       |
| Ames mutagenicity test   | 0.705 | no units | TEST QSAR |       |
| Developmental toxin test |       |          | TEST QSAR |       |

Carbon disulfide  
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OCCURRENCE DATA

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## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 6,049                               | 723                  | Sites                 | 12                      | 0.01                       | 0.1                       | 0.4                          | 34                         | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 243                                 | 54                   | Sites                 | 22                      | 0.01                       | 0.02                      | 0.1                          | 34                         | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 5,806                               | 669                  | Sites                 | 12                      | 0.01                       | 0.1                       | 0.6                          | 7.3                        | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) | 29                  | 8,774,313                     | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) | 250M - 500M                  |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 127                                 | 8                    | Sites                  | 6.3                     | 0.5                        | 0.73                      | 1.6                          | 8.72                       | ug/L        |       |
| Bradley et al. 2018 (Finished) [53]                           | 2016        | 26                                  | 9                    | Sites                  | 35                      | 0.01649                    | 0.0211                    | 0.151                        | 0.2946                     | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 799                                 | 20                   | Sites                  | 2.5                     | 0.51                       | 0.74                      | 3.4                          | 240                        | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 187                                 | 15                   | Sites                  | 8.02                    | 0.1                        | 0.1                       | 0.2                          | 0.3                        | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 3,202                               | 168                  | Sites                  | 5.25                    | 0.1                        | 0.3                       | 3                            | 12.4                       | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 3,385                               | 183                  | Sites                  | 5.41                    | 0.1                        | 0.2                       | 2.87                         | 12.4                       | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                                  | 14                   | Sites                  | 37                      | 0.01248                    | 0.0357                    | 0.137                        | 0.2378                     | ug/L        |       |
| Arnold et al. 2016 (Unfiltered) [7]                           | 2012 - 2013 | 685                                 | 120                  | Sites                  | 18                      | 0.0102                     | 0.0749                    | 0.61                         | 4.2                        | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water                              | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expocast exposure                                  |      | 0.00000243                                    |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|-------------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 18.0411    | days                    |       |
| Boiling point                                                     | OPERA QSAR | 47.2959    | degree C                |       |
| Boiling point                                                     | TEST QSAR  |            |                         |       |
| Vapor pressure                                                    | OPERA QSAR | 365.359    | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  |            |                         |       |
| Solubility in water                                               | OPERA QSAR | 0.0213938  | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  |            |                         |       |
| Bioconcentration factor                                           | OPERA QSAR | 18.2423    | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  |            |                         |       |
| Henry's Law constant                                              | OPERA QSAR | 0.00944903 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 1.95653    | no units                |       |

**Carbon disulfide**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 11               | ATSDR. 1996. Toxicological Profile for Carbon Disulfide. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                                                                                                                                                               |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. Environmental science & technology, 51(9), 4792-4802.                                                                                                                                               |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. Environmental science & technology, 52(23), 13972-13985.                                                                                |
| 191              | USEPA. 1987. Chemical Assessment Summary, Carbon Disulfide. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, D.C.                                                                                                                                                                                                                        |

**Chlordecone**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                        |                                                     |
|------------------------|-----------------------------------------------------|
| <b>Name:</b>           | Chlordecone                                         |
| <b>CASRN:</b>          | 143-50-0                                            |
| <b>DTXSID:</b>         | <a href="#">DTXSID1020770</a>                       |
| <b>Use:</b>            | Formerly as insecticide, fungicide, miticide        |
| <b>Chemical Notes:</b> | Canceled pesticide. Last end of use date: 4/4/1977. |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxics                                 | X |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 | X |

**CONTAMINANT SUMMARY & DECISION**

|                                 |                                   |
|---------------------------------|-----------------------------------|
| <b>Draft CCL5 List Decision</b> | <b>Final Hazard Quotient (HQ)</b> |
| List                            | 67                                |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 7       | carcinogen with linear MOA |            |           |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.003                  | liver hepatocellular carcinoma | general population | IRIS              | 2009                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.2                          | 90th Percentile                               | All Ambient Water                    | NWIS   | 2008-2017 |

**PUBLIC NOMINATION STATUS**

|                          |
|--------------------------|
| <b>Public Nomination</b> |
|                          |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



**Chlordecone**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value  | Units                     | Assessment Source | Critical Study     | Critical Effect                                   | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                                                                                                                                                              |
|------------------------------------|--------|---------------------------|-------------------|--------------------|---------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.0003 | mg/kg/day                 | IRIS 2009         | Larson et al. 1979 | renal lesions (glomerulosclerosis) in female rats | general population | 33.8                        | 1.78       | [300]                    | NOTE: canceled registration, OPP does not provide a publicly-available health assessment for chlordecone; the chlordecone entry in the IRIS database was preserved at the request of EPA program offices and regions and serves as |
| Cancer Slope Factor (CSF)          | 10     | (mg/kg/day) <sup>-1</sup> | IRIS 2009         | NCI 1976           | liver hepatocellular carcinoma                    | general population | 33.8                        | 0.00296    | [300]                    | NOTE: canceled registration, OPP does not provide a publicly-available health assessment for chlordecone; the chlordecone entry in the IRIS database was preserved at the request of EPA program offices and regions and serves as |
| Cancer Classification (CC)         | L      |                           | IRIS 2009         |                    |                                                   |                    |                             |            | [300]                    | NOTE: canceled registration, OPP does not provide a publicly-available health assessment for chlordecone; the chlordecone entry in the IRIS database was preserved at the request of EPA program offices and regions and serves as |
|                                    |        |                           | OPP               |                    |                                                   |                    |                             |            |                          |                                                                                                                                                                                                                                    |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                | Value         | Units                     | Source                         | Notes |
|---------------------------------------------|---------------|---------------------------|--------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |               |                           |                                |       |
| Acute Minimal Risk Level (MRL)              | 0.01          | mg/kg/day                 | CDC ATSDR                      |       |
| Cancer Slope Factor (CSF)                   | 16            | (mg/kg/day) <sup>-1</sup> | CalEPA OEHHA Chemical Database |       |
| Inhalation Unit Risk (IUR)                  | 0.0046        | ug/m <sup>3</sup>         | CalEPA OEHHA Chemical Database |       |
| Intermediate Minimal Risk Level (MRL)       | 0.0005        | mg/kg/day                 | CDC ATSDR                      |       |
| Cancer Classification (CC)                  | 2B            | no units                  | WHO IARC                       |       |
| Cancer Classification (CC)                  | Female.Mice P | no units                  | HHS NTP                        |       |
| Cancer Classification (CC)                  | Female.Rats P | no units                  | HHS NTP                        |       |
| Cancer Classification (CC)                  | Male.Mice P   | no units                  | HHS NTP                        |       |
| Cancer Classification (CC)                  | Male.Rats P   | no units                  | HHS NTP                        |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                      | Value | Units     | Source                  | Notes |
|---------------------------------------------------|-------|-----------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |       |           |                         |       |
| LD50                                              | 2550  | mg/kg     | NIH HSDB                | max   |
| LD50                                              | 65    | mg/kg     | NIH HSDB                | min   |
| Percent of active toxicant in vitro assays tested | 44.29 | percent   | EPA Chemistry Dashboard |       |
| TD50                                              | 0.705 | mg/kg/day | NIH CPDB                | min   |
| TD50                                              | 29.3  | mg/kg/day | NIH CPDB                | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0003882 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.529     | no units | TEST QSAR |       |
| Developmental toxin test |           |          | TEST QSAR |       |

## Chlordecone

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 1                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 2                                   | 2                    | Sites                  | 100                     | 0.2                        | 0.2                       | 0.2                          | 0.2                        | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 2                                   | 2                    | Sites                  | 100                     | 0.2                        | 0.2                       | 0.2                          | 0.2                        | ug/L        |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                       | <b>Value</b>         | <b>Units</b>           | <b>Model</b>            | <b>Notes</b>               |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expocast exposure                                  |      | 0.000000194                                   |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 913.927     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 373.013     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 354.456     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.000000162 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.000000465 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.00000296  | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.00000232  | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 1458.84     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  |             |                         |       |
| Henry's Law constant                                              | OPERA QSAR | 0.0000926   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 5.49303     | no units                |       |

**Chlordecone**

CCL 5 Contaminant Information Sheet

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| Reference Number | Full Reference                                                                                                                                                                                                  |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 300              | USEPA. 2009. Chemical Assessment Summary, Chlordecone (Kepone). U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, D.C. |

## Chloromethane (Methyl chloride)

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                                              |
|-----------------|--------------------------------------------------------------|
| Name:           | Chloromethane (Methyl chloride)                              |
| CASRN:          | 74-87-3                                                      |
| DTXSID:         | <a href="#">DTXSID0021541</a>                                |
| Use:            | Foaming agent; in organic synthesis; naturally-occurring gas |
| Chemical Notes: |                                                              |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxics                                 | X |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 |                            |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity | Prevalence | Magnitude |
|---------|----------|------------|-----------|
|         |          | 9          | 6         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect | Target Pop. | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------|-------------|-------------------|----------------------|
|                                                          |                        |                 |             |                   |                      |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 1.7                          | 90th Percentile                               | Finished Water                       | UCMR3  | 2013-2015 |

## PUBLIC NOMINATION STATUS

|                   |
|-------------------|
| Public Nomination |
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

Chloromethane (Methyl chloride)  
CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study     | Critical Effect           | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                                  |
|------------------------------------|--------|-----------|-------------------|--------------------|---------------------------|--------------------|-----------------------------|------------|--------------------------|--------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.0036 | mg/kg/day | OW 1989           | Repko et al., 1976 | mild neurological effects | general population | 33.8                        | 21.3       | [205]                    |                                                                                                        |
| Cancer Classification (CC)         | I      |           | PPRTV 2012        |                    |                           |                    |                             |            | [326]                    | NOTE: no oral toxicity values have been derived for chloromethane because it primarily exists as a gas |
| Cancer Classification (CC)         | D      |           | IRIS 2001         |                    |                           |                    |                             |            | [243]                    |                                                                                                        |
| Cancer Classification (CC)         | C      |           | OW 1989           |                    |                           |                    |                             |            | [205]                    |                                                                                                        |
|                                    |        |           | ATSDR 1998        |                    |                           |                    |                             |            | [13]                     |                                                                                                        |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                     | Value | Units             | Source         | Notes |
|--------------------------------------------------|-------|-------------------|----------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |                   |                |       |
| 10-day Health Advisory                           | 0.4   | mg/L              | EPA DWSHA 2018 |       |
| Acute inhalation Minimal Risk Level (MRL)        | 0.5   | ppm               | CDC ATSDR      |       |
| Cancer Classification (CC)                       | 3     | no units          | WHO IARC       |       |
| Chronic inhalation Minimal Risk Level (MRL)      | 0.05  | ppm               | CDC ATSDR      |       |
| Intermediate Inhalation Minimal Risk Level (MRL) | 0.2   | ppm               | CDC ATSDR      |       |
| Reference Concentration (RfC)                    | 0.09  | mg/m <sup>3</sup> | EPA IRIS       |       |
| Subchronic RfC                                   | 3     | mg/m <sup>3</sup> | EPA PPRTV      |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units | Source   | Notes |
|---------------------------------------------|-------|-------|----------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |          |       |
| LD50                                        | 1800  | mg/kg | NIH HSDB |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0057016 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.487     | no units | TEST QSAR |       |
| Developmental toxin test |           |          | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
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EPA - Office of Water

Chloromethane (Methyl chloride)  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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| Scoring Data                                                   |             |                               |                                  |                    |                                                    |                         |                         |                                   |                                                    |             |                                     |
|----------------------------------------------------------------|-------------|-------------------------------|----------------------------------|--------------------|----------------------------------------------------|-------------------------|-------------------------|-----------------------------------|----------------------------------------------------|-------------|-------------------------------------|
| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects                | PWS/Sites/ Samples | Percent with Detects                               | Minimum Conc. (Detects) | Median Conc. (Detects)  | 90th Percentile (Detects)         | Maximum Conc. (Detects)                            | Conc. Units | Notes                               |
| <b>Finished Water</b>                                          |             |                               |                                  |                    |                                                    |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                                  | Prevalence         |                                                    |                         |                         | Magnitude                         |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 | 4,916                         | 138                              | Sites              | 2.81                                               | 0.2                     | 0.4                     | 1.7                               | 11.3                                               | ug/L        |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                                  |                    |                                                    |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                                  |                    |                                                    |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 | 23,478                        | 528                              | Sites              | 2.25                                               | 0.00073                 | 1.4                     | 5                                 | 312                                                | ug/L        |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 | 20,246                        | 248                              | Sites              | 1.22                                               | 0.01                    | 1.9                     | 12.2                              | 550                                                | ug/L        |                                     |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                                  |                    |                                                    |                         |                         |                                   |                                                    |             |                                     |
| <b>Ambient Water</b>                                           |             |                               |                                  |                    |                                                    |                         |                         |                                   |                                                    |             |                                     |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 7,366                         | 189                              | Sites              | 2.57                                               | 0.02                    | 0.1                     | 0.2                               | 320                                                | ug/L        |                                     |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 269                           | 53                               | Sites              | 20                                                 | 0.02                    | 0.1                     | 0.1                               | 320                                                | ug/L        |                                     |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 7,097                         | 136                              | Sites              | 1.92                                               | 0.1                     | 0.1                     | 0.2                               | 21                                                 | ug/L        |                                     |
| <b>Pesticide Application Data</b>                              |             | <b>Number of States</b>       | <b>Amount Applied (lbs/year)</b> | <b>Date</b>        | <b>Toxic Release Data</b>                          |                         | <b>Number of States</b> | <b>Amount Released (lbs/year)</b> | <b>Chemical Production Data</b>                    |             | <b>Production Volume (lbs/year)</b> |
| Estimated Annual Agricultural Pesticide Use (USGS)             |             |                               |                                  |                    | Toxic Release Inventory (TRI) Program (EPA) (2016) |                         | 24                      | 1,088,720                         | Chemical Data Reporting (CDR) Results (EPA) (2016) |             | 1B - 5B                             |

| Non-Scoring Data                                              |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 398                           | 40                | Sites               | 10                   | 0.19                    | 0.745                  | 1.6                       | 35                      | ug/L        |       |
| Drinking Water Monitoring Data - MA (Finished)                | 2006 - 2020 | 899                           | 83                | Sites               | 9.23                 | 0.5                     | 1.1                    | 3.85                      | 44.6                    | ug/L        |       |
| Drinking Water Monitoring Data - WA (Finished)                | 2006 - 2011 | 1,188                         | 28                | Sites               | 2.36                 | 0.07                    | 1.42                   | 4.73                      | 320                     | ug/L        |       |
| Bradley et al. 2018 (Finished) [53]                           | 2016        | 26                            | 6                 | Sites               | 23                   | 0.1607                  | 0.186                  | 0.233                     | 0.2694                  | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 4,242                         | 218               | Sites               | 5.14                 | 0.076                   | 0.75                   | 2                         | 21.2                    | ug/L        |       |
| Drinking Water Monitoring Data - FL (Source)                  | 2006 - 2011 | 3                             | 2                 | Sites               | 67                   | 0.49                    | 36.2                   | 64.8                      | 72                      | ug/L        |       |
| Drinking Water Monitoring Data - MA (Source)                  | 2006 - 2020 | 133                           | 17                | Sites               | 13                   | 0.5                     | 0.7                    | 3.66                      | 4.9                     | ug/L        |       |
| Drinking Water Monitoring Data - PA (Source)                  | 2006 - 2011 | 14                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WA (Source)                  | 2006 - 2011 | 1,666                         | 8                 | Sites               | 0.48                 | 0.65                    | 0.83                   | 5.04                      | 6.3                     | ug/L        |       |
| Drinking Water Monitoring Data - WI (Source)                  | 2012-2019   | 135                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 240                           | 3                 | Sites               | 1.25                 | 0.2                     | 0.4                    | 0.82                      | 1                       | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 3,492                         | 38                | Sites               | 1.09                 | 0.1                     | 0.4                    | 1.1                       | 4                       | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 3,728                         | 41                | Sites               | 1.1                  | 0.1                     | 0.4                    | 1.08                      | 4                       | ug/L        |       |
| Arnold et al. 2016 (Unfiltered) [7]                           | 2012 - 2013 | 685                           | 2                 | Sites               | 0.29                 | 0.3                     | 1.45                   | 2.37                      | 2.6                     | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   | Prevalence          |                      |                         |                        | Magnitude                 |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      |                                         |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|----------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 16.4952    | days                    |       |
| Boiling point                                                  | OPERA QSAR | -26.1513   | degree C                |       |
| Boiling point                                                  | TEST QSAR  | -0.434     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 2473.43    | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 1866.38    | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0623759  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.418794   | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 9.6851     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 3.8815     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.00943159 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 0.947026   | no units                |       |

**Chloromethane (Methyl chloride)**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 13               | ATSDR. 1998. Toxicological Profile for Chloromethane. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                                                                                                                                                                  |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. Environmental science & technology, 52(23), 13972-13985.                                                                                |
| 205              | USEPA. 1989. Chloromethane Health Advisory. U.S. Environmental Protection Agency, Office of Water, Washington, D.C.                                                                                                                                                                                                                                                                                                                |
| 243              | USEPA. 2001. Chemical Assessment Summary, Chloromethane. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, D.C.                                                                                                                                                                                                                           |
| 326              | USEPA. 2012. Provisional Peer-Reviewed Toxicity Values for Chloromethane. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH.                                                                                                                                                                  |

**Chlorothalonil**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Chlorothalonil                |
| CASRN:          | 1897-45-6                     |
| DTXSID:         | <a href="#">DTXSID0020319</a> |
| Use:            | Fungicide; bactericide        |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.0051                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 4          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                            | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 100                    | renal epithelial hyperplasia in the proximal convoluted tubules of females | general population | OPP               | 2010                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.51                         | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



## Chlorothalonil

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study      | Critical Effect                                                            | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|---------------------|----------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.02  | mg/kg/day | OPP 2010          | Spencer-Briggs 1996 | renal epithelial hyperplasia in the proximal convoluted tubules of females | general population | 33.8                        | 118        | [309]                    |       |
| Cancer Classification (CC)         | L     |           | OPP 2010          |                     |                                                                            |                    |                             |            | [309]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value         | Units          | Source                         | Notes |
|---------------------------------------------|---------------|----------------|--------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |               |                |                                |       |
| 10-day Health Advisory                      | 0.2           | mg/L           | EPA DWSHA 2018                 |       |
| Cancer Slope Factor (CSF)                   | 0.017         | (mg/kg/day)^-1 | CalEPA OEHHA Chemical Database |       |
| Chronic Health-Based Guidance Value         | 0.003         | mg/L           | MN DOH                         |       |
| Lifetime Health Advisory                    | 0.0015        | mg/L           | EPA DWSHA 2018                 |       |
| Cancer Classification (CC)                  | 2B            | no units       | WHO IARC                       |       |
| Cancer Classification (CC)                  | Female.Mice N | no units       | HHS NTP                        |       |
| Cancer Classification (CC)                  | Female.Rats P | no units       | HHS NTP                        |       |
| Cancer Classification (CC)                  | Male.Mice N   | no units       | HHS NTP                        |       |
| Cancer Classification (CC)                  | Male.Rats P   | no units       | HHS NTP                        |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 10000 | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 242   | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 0.9   | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 500   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 1.8   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 250   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 37.28 | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 2.3   | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 750   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 1.5   | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 250   | mg/kg/day | EPA Toxicity Reference Database | max   |
| TD50                                             | 1180  | mg/kg/day | NIH CPDB                        | min   |
| TD50                                             | 20100 | mg/kg/day | NIH CPDB                        | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0048978 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.05      | no units | TEST QSAR |       |
| Developmental toxin test | 0.29      | no units | TEST QSAR |       |

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OCCURRENCE DATA

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 5,787                         | 21                | Sites              | 0.36                 | 0.01                    | 0.09                   | 0.51                      | 3.33                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 951                           | 16                | Sites              | 1.68                 | 0.01                    | 0.07                   | 0.626                     | 3.33                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 4,836                         | 5                 | Sites              | 0.1                  | 0.09                    | 0.25                   | 0.385                     | 0.41                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 48               | 11,506,189                | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 7                | 1,036,501                  | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 69                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 12                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 739                           | 3                 | Sites               | 0.41                 | 0.018                   | 0.033                  | 0.0354                    | 0.036                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 137                           | 22                | Sites               | 16                   | 1.00E - 04              | 0.0046                 | 0.0282                    | 0.158                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 70                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 207                           | 22                | Sites               | 11                   | 1.00E - 04              | 0.0046                 | 0.0282                    | 0.158                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 1                 | Sites               | 0.44                 | 3.2                     | 3.2                    | 3.2                       | 3.2                     | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 218                           | 1                 | Sites               | 0.46                 | 3.2                     | 3.2                    | 3.2                       | 3.2                     | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 565                           | 5                 | Sites               | 0.88                 | 0.0067                  | 0.105                  | 0.159                     | 0.187                   | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 5                 | Sites               | 13                   | 0.0033                  | 0.0061                 | 0.00638                   | 0.0065                  | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.000000218                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 5.52071     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 344.049     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 341.73      | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000000897 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000218776 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00000281  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0000229   | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 75.4862     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 44.2        | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.00000281  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.09917     | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                              |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                            |
| 309              | USEPA. 2010. Chlorothalonil. Registration Request for Use on Low-Growing Berry Subgroup 13-07G; Bushberry Subgroup 13-07B; Onion, Bulb Subgroup 3-07A; and Onion, Green Subgroup 3-07B. Human Health Risk Assessment. EPA-HQ-OPP-2018-0517-0003. DP No. D370486. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C. |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                      |

## Chlorpyrifos

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Chlorpyrifos                  |
| CASRN:          | 2921-88-2                     |
| DTXSID:         | <a href="#">DTXSID4020458</a> |
| Use:            | Insecticide                   |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxicants                              | X |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              | X |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 | X |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.015                      |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 7       | reproductive and developmental effects | 1          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                         | Target Pop.               | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------|---------------------------|-------------------|----------------------|
| HRL                                                      | 2                      | decreased brain cholinesterase activity | women of childbearing age | OPP               | 2011                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0305                       | 90th Percentile                               | Finished Water                       | UCMR4  | 2018-2019 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
| X                 |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**Chlorpyrifos**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value  | Units     | Assessment Source | Critical Study                        | Critical Effect                                          | Target Population         | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|---------------------------------------|----------------------------------------------------------|---------------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0003 | mg/kg/day | OPP 2011          | Hoberman 1998; Mandralla & Brzak 1998 | decreased brain cholinesterase activity in pregnant dams | women of childbearing age | 35.4                        | 1.69       | [318]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                      | Value  | Units     | Source                                | Notes |
|---------------------------------------------------|--------|-----------|---------------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |        |           |                                       |       |
| 10-day Health Advisory                            | 0.03   | mg/L      | EPA DWSHA 2018                        |       |
| Acute Health-Based Guidance Value                 | 0.002  | mg/L      | MN DOH                                |       |
| Acute Health-Based Guidance Value                 | 0.0006 | mg/L      | MN DOH                                |       |
| Acute Minimal Risk Level (MRL)                    | 0.003  | mg/kg/day | CDC ATSDR                             |       |
| Chronic Health-Based Guidance Value               | 0.0006 | mg/L      | MN DOH                                |       |
| Drinking Water Guideline Value                    | 0.03   | mg/L      | WHO Drinking Water Quality Guidelines |       |
| Intermediate Minimal Risk Level (MRL)             | 0.003  | mg/kg/day | CDC ATSDR                             |       |
| Lifetime Health Advisory                          | 0.002  | mg/L      | EPA DWSHA 2018                        |       |
| Maximum Allowable Concentration (MAC)             | 0.09   | mg/L      | Canadian Drinking Water Guidelines    |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.0006 | mg/L      | MN DOH                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 1000  | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 26.9  | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 15    | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 0.03  | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 0.01  | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 3     | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 18.73 | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 0.75  | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 0.15  | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0003048 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | -0.097    | no units | TEST QSAR |       |
| Developmental toxin test | 0.595     | no units | TEST QSAR |       |

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| Scoring Data                                                   |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |  |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|--|--|
| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |  |  |
| <b>Finished Water</b>                                          |             |                               | Prevalence        |                    |                      | Magnitude               |                        |                           |                         |             |       |  |  |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 | 3,649                         | 1                 | Sites              | 0.03                 | 0.0305                  | 0.0305                 |                           | 0.0305                  | ug/L        |       |  |  |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |  |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |  |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |  |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |  |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |  |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |  |
| <b>Ambient Water</b>                                           |             |                               | Prevalence        |                    |                      | Magnitude               |                        |                           |                         |             |       |  |  |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 11,249                        | 620               | Sites              | 5.51                 | 0.00022                 | 0.007                  | 0.029                     | 0.57                    | ug/L        |       |  |  |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,233                         | 573               | Sites              | 26                   | 0.00022                 | 0.007                  | 0.029                     | 0.57                    | ug/L        |       |  |  |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9,017                         | 47                | Sites              | 0.52                 | 0.00057                 | 0.005                  | 0.0149                    | 0.215                   | ug/L        |       |  |  |

| Pesticide Application Data                         |  | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 |  | Number of States | Amount Released (lbs/year) | Chemical Production Data                           |  | Production Volume (lbs/year) |
|----------------------------------------------------|--|------------------|---------------------------|------|----------------------------------------------------|--|------------------|----------------------------|----------------------------------------------------|--|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |  | 48               | 7,971,347                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |  |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |  |                              |

| Non-Scoring Data                                                                       |  |      |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|----------------------------------------------------------------------------------------|--|------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Non-Nationally Representative Water Data                                               |  |      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| Finished Water                                                                         |  |      |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         |  |      | 2006 - 2020 | 6                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           |  |      | 2001 - 2013 | 17                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          |  |      | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          |  |      | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
|                                                                                        |  |      |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Ambient Water                                                                          |  |      |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           |  |      | 2006 - 2020 | 92                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          |  |      | 2008 - 2017 | 1,553                         | 94                | Sites               | 6.05                 | 0.00051                 | 0.0067                 | 0.0618                    | 11.3                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            |  |      | 2008 - 2017 | 3,630                         | 6                 | Sites               | 0.17                 | 0.0028                  | 0.00485                | 0.0205                    | 0.0398                  | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              |  |      | 2008 - 2017 | 5,182                         | 100               | Sites               | 1.93                 | 0.00051                 | 0.0067                 | 0.0606                    | 11.3                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 |  |      | 2001 - 2013 | 229                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        |  |      | 2001 - 2013 | 219                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          |  |      | 2001 - 2013 | 12                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] |  |      | 1990 - 2018 | 20,007                        | 3,554             | Sites               | 18                   | 7e-07                   | 0.0188                 | 0.162                     | 9.4                     | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     |  |      | 2012 - 2014 | 38                            | 30                | Sites               | 79                   | 2.42e-05                | 0.000322               | 0.00396                   | 0.0904                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      |  |      | 2012 - 2013 | 690                           | 1                 | Sites               | 0.14                 | 6e-04                   | 6e-04                  | 6e-04                     | 6e-04                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           |  |      | 2009 - 2010 | 2                             | 1                 | Sites               | 50                   | 0.009                   | 0.0095                 | 0.0099                    | 0.01                    | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           |  |      | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                                     |  |      | 2002 - 2010 | 133                           | 1                 | Samples             | 0.8                  |                         |                        |                           | 0.01                    | ug/L        |       |
|                                                                                        |  |      |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Waste Water Effluent                                                                   |  |      |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                                                   |  |      | 2011 - 2017 | 21                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
|                                                                                        |  |      |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       |  | Date | Source      | Value                         | Units             | Model               |                      | Notes                   |                        |                           |                         |             |       |
|                                                                                        |  |      |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Exposure exposure                               |      | 0.000000023                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units       | Notes |
|----------------------------------------------------------------|------------|------------|-------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.75106    | days        |       |
| Boiling point                                                  | OPERA QSAR | 371.599    | degree C    |       |
| Boiling point                                                  | TEST QSAR  |            |             |       |
| Vapor pressure                                                 | OPERA QSAR | 0.0000259  | mmHg        |       |
| Vapor pressure                                                 | TEST QSAR  | 0.0000308  | mmHg        |       |
| Solubility in water                                            | OPERA QSAR | 0.00000316 | mol/L       |       |
| Solubility in water                                            | TEST QSAR  | 0.00000236 | mol/L       |       |
| Bioconcentration factor                                        | OPERA QSAR | 1687.74    | no units    |       |
| Bioconcentration factor                                        | TEST QSAR  | 380.189    | no units    |       |
| Henry's Law constant                                           | OPERA QSAR | 0.00000209 | atm-m^3/mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 4.85185    | no units    |       |

**Chlorpyrifos**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                                                                                                                                   |
| 318              | USEPA. 2011. Chlorpyrifos: Preliminary Human Health Risk Assessment for Registration Review. EPA-HQ-OPP-2008-0850-0025. DP No. D388070. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                 |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**Clomazone**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Clomazone                     |
| CASRN:          | 81777-89-1                    |
| DTXSID:         | <a href="#">DTXSID1032355</a> |
| Use:            | Herbicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.000079                   |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 3       | no adverse effects | 9          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect               | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 5000                   | no adverse effects identified | general population | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.39567                      | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



## Clomazone

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                                | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.84  | mg/kg/day | OPP 2018          | Morrow 1983    | no effects identified at loael selected as pod | general population | 33.8                        | 4970       | [398]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2018          |                |                                                |                    |                             |            | [398]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source   | Notes |
|---------------------------------------------|-------|-----------|----------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |          |       |
| Acute Human Health Benchmark                | 30    | mg/L      | EPA HHBP |       |
| Acute PAD                                   | 1     | mg/kg/day | EPA HHBP |       |
| Chronic Human Health Benchmark              | 5.4   | mg/L      | EPA HHBP |       |
| Population-Adjusted Dose (PAD)              | 0.84  | mg/kg/day | EPA HHBP |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 1369  | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 2077  | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 100   | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 300   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 100   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 50    | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 5.13  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 273   | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 160.9 | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0025942 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 1.078     | no units | TEST QSAR |       |
| Developmental toxin test | 0.592     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Clomazone  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 14                            | 1                 | Sites               | 7.14                 | 0.01                    | 0.0659                 | 0.396                     | 0.537                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 14                            | 1                 | Sites               | 7.14                 | 0.01                    | 0.0659                 | 0.396                     | 0.537                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 33               | 1,039,399                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 5                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 132                           | 33                | Sites               | 25                   | 0.0022                  | 0.0476                 | 1.45                      | 19.4                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 3                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 135                           | 33                | Sites               | 24                   | 0.0022                  | 0.0476                 | 1.45                      | 19.4                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 221                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 216                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 5                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 414                           | 129               | Sites               | 31                   | 0.0045                  | 0.288                  | 2.82                      | 12                      | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 2                 | Sites               | 5.26                 | 0.0064                  | 0.467                  | 0.835                     | 0.9271                  | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 7.58E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.33433     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 279.519     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 310.651     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000103082 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.0000329   | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00482471  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00106414  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 37.6372     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  |             |                         |       |
| Henry's Law constant                                           | OPERA QSAR | 3.33E-08    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.35315     | no units                |       |

**Clomazone**

CCL 5 Contaminant Information Sheet

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                                                                                                                                                                               |
| 398              | USEPA. 2018. Clomazone: Human Health Risk Assessment for Proposed (1) New Uses on Cilantro, Dill, and Rapeseed Subgroup 20A; (2) Tolerance Revisions of Cucurbit Vegetable Group 9; (3) Tolerance Expansions of Representative Commodities to (i) Cottonseed Subgroup 20C, (ii) Stalk and Stem Vegetable Subgroup 22A, except Kohlrabi, (iii) Dry Bean, and (iv) Succulent Bean; and (4) Tolerance Conversions from Crop Subgroup 5A (Head and Stem Brassica) to Crop Group 5-16 (Brassica Head and Stem Vegetable), Chinese Broccoli and Kohlrabi. EPA-HQ-OPP-2017-0372-0008. DP No. D445140. |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                                                                                                                                                                                         |

**Clopyralid**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Clopyralid                    |
| CASRN:          | 1702-17-6                     |
| DTXSID:         | <a href="#">DTXSID9029221</a> |
| Use:            | Herbicide, food additive      |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.00015                    |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 4       | non-cancer effects | 5          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                      | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 900                    | increased epithelial hyperplasia and thickening of the limiting ridge of the stomach | general population | OPP               | 2019                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.132                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Clopyralid

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study                   | Critical Effect                                                                      | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------------------------|--------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.15  | mg/kg/day | OPP 2019          | Barna-Lloyd et al. 1985 and 1986 | increased epithelial hyperplasia and thickening of the limiting ridge of the stomach | general population | 33.8                        | 888        | [415]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2019          |                                  |                                                                                      |                    |                             |            | [415]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Chronic Human Health Benchmark              | 0.96  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.96  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.15  | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 4300  | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 5000  | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 150   | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 2000  | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 15    | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 500   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 2.38  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 5000  | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 2000  | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0099541 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.114     | no units | TEST QSAR |       |
| Developmental toxin test | 0.26      | no units | TEST QSAR |       |

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OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 6,464                         | 34                | Sites              | 0.53                 | 0.01                    | 0.04                   | 0.132                     | 0.53                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 969                           | 30                | Sites              | 3.1                  | 0.01                    | 0.04                   | 0.136                     | 0.53                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 5,495                         | 4                 | Sites              | 0.07                 | 0.01                    | 0.015                  | 0.02                      | 0.02                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 46               | 2,037,895                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 6                 | Sites               | 35                   | 0.0057                  | 0.012                  | 0.0474                    | 0.684                   | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 198                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 542                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 740                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 9                 | Sites               | 3.93                 | 0.005661                | 0.012                  | 0.036                     | 0.36                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 218                           | 5                 | Sites               | 2.29                 | 0.005661                | 0.00566                | 0.0227                    | 0.024                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 4                 | Sites               | 33                   | 0.0057                  | 0.012                  | 0.036                     | 0.36                    | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 182                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 106                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 1.17E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|----------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.53754    | days                    |       |
| Boiling point                                                  | OPERA QSAR | 286.1      | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 293.982    | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.0000209  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.0000647  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00334275 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0301995  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 3.76695    | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 2.5527     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 4.79E-09   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 1.19217    | no units                |       |

**Clopyralid**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 415              | USEPA. 2019. Clopyralid. Draft Human Health Risk Assessment for Registration Review of the Herbicide. EPA-HQ-OPP-2014-0167-0031. DP No. D442247. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                        |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                    |

**Clothianidin**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                |
|-----------------|--------------------------------|
| Name:           | Clothianidin                   |
| CASRN:          | 210880-92-5                    |
| DTXSID:         | <a href="#">DTXSID2034465</a>  |
| Use:            | Insecticide used on food crops |
| Chemical Notes: |                                |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.000017                   |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 4       | reproductive and developmental effects | 10         | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                                | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 100                    | decreased body weight gain, delayed sexual maturation, decreased thymus weights in F1 pups, increased stillbirths in F1 and F2 | bottle-fed infants | OPP               | 2019                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0017                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



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**HEALTH EFFECTS DATA**

**Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units     | Assessment Source | Critical Study              | Critical Effect                                                                                                                | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.098 | mg/kg/day | OPP 2019          | Freshwater and Astroff 2000 | decreased body weight gain, delayed sexual maturation, decreased thymus weights in F1 pups, increased stillbirths in F1 and F2 | bottle-fed infants | 151                         | 130        | [416]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2019          |                             |                                                                                                                                |                    |                             |            | [416]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                      | Value | Units     | Source                                  | Notes |
|---------------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |       |           |                                         |       |
| Acute Health-Based Guidance Value                 | 0.2   | mg/L      | MN DOH                                  |       |
| Acute Human Health Benchmark                      | 1.7   | mg/L      | EPA HHBP                                |       |
| Acute PAD                                         | 0.25  | mg/kg/day | EPA HHBP                                |       |
| Chronic Health-Based Guidance Value               | 0.2   | mg/L      | MN DOH                                  |       |
| Chronic Human Health Benchmark                    | 0.63  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                      | 0.63  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)                    | 0.098 | mg/kg/day | EPA HHBP                                |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.2   | mg/L      | MN DOH                                  |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 389       | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 5000      | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 215.89999 | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 31.200001 | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 10        | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 65.1      | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 1.94      | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 202       | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic LOAEL                                 | 40.900002 | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 21.2      | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 34        | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0023933 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.998     | no units | TEST QSAR |       |
| Developmental toxin test | 0.597     | no units | TEST QSAR |       |

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 5                             | 1                 | Sites               | 20                   | 9.00E - 04              | 0.0014                 | 0.0017                    | 0.0019                  | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 5                             | 1                 | Sites               | 20                   | 9.00E - 04              | 0.0014                 | 0.0017                    | 0.0019                  | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 31               | 163,492                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 10                            | 3                 | Sites               | 30                   | 0.008                   | 0.008                  | 0.0102                    | 0.018                   | ug/L        |       |
| Klarich et al. 2017 (Finished) [117]                                                   | 2016        | 20                            | 16                | Sites               | 80                   | 0.00389                 | 0.0119                 | 0.0291                    | 0.03346                 | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 131                           | 55                | Sites               | 42                   | 9.00E - 04              | 0.0092                 | 0.0783                    | 1.34                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 12                            | 4                 | Sites               | 33                   | 0.0123                  | 0.0274                 | 0.0491                    | 0.0555                  | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 143                           | 59                | Sites               | 41                   | 9.00E - 04              | 0.0094                 | 0.0777                    | 1.34                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 227                           | 3                 | Sites               | 1.32                 | 0.008                   | 0.008                  | 0.0265                    | 0.045                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 218                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 10                            | 3                 | Sites               | 30                   | 0.008                   | 0.008                  | 0.0265                    | 0.045                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 279                           | 5                 | Sites               | 1.79                 | 0.0311                  | 0.0462                 | 0.0645                    | 0.0675                  | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 9                 | Sites               | 24                   | 0.0026                  | 0.0113                 | 0.0438                    | 0.0663                  | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 9.22E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.55019     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 326.625     | degree C                |       |
| Boiling point                                                  | TEST QSAR  |             |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000000197 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  |             |                         |       |
| Solubility in water                                            | OPERA QSAR | 0.00076435  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00200447  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 9.38346     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  |             |                         |       |
| Henry's Law constant                                           | OPERA QSAR | 1.82E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 0.762847    | no units                |       |

**Clothianidin**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                         |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                       |
| 117              | Klarich, K.L., Pflug, N.C., DeWald, E.M., Hladik, M.L., Kolpin, D.W., Cwiertny, D.M. and LeFevre, G.H., 2017. Occurrence of neonicotinoid insecticides in finished drinking water and fate during drinking water treatment. <i>Environmental Science &amp; Technology Letters</i> , 4(5), pp.168-173.                                  |
| 416              | USEPA. 2019. Clothianidin. Human Health Risk Assessment to Address Residues from New/Amended Uses of Thiamethoxam. EPA-HQ-OPP-2018-0779-0004. DP No. D446686. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                               |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society. |

**Cobalt**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                                               |
|-----------------|-----------------------------------------------------------------------------------------------|
| Name:           | Cobalt                                                                                        |
| CASRN:          | 7440-48-4                                                                                     |
| DTXSID:         | <a href="#">DTXSID1031040</a>                                                                 |
| Use:            | Use data are for cobaltous chloride: Formerly in medicines; as germicide; naturally-occurring |
| Chemical Notes: |                                                                                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 2.6                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 7       | reproductive and developmental effects | 9          | 7         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                     | Target Pop.               | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------------------|---------------------------|-------------------|----------------------|
| HRL                                                      | 2                      | "decreased iodine uptake in humans" | women of childbearing age | PPRTV             | 2008                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 5.198                        | 90th Percentile                               | Finished Water                       | UCMR3  | 2013-2015 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Cobalt

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study          | Critical Effect                     | Target Population         | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|-------------------------|-------------------------------------|---------------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0003 | mg/kg/day | PPRTV 2008        | Roche and Layrisse 1956 | "decreased iodine uptake in humans" | women of childbearing age | 35.4                        | 1.69       | [294]                    |       |
|                                    |        |           | ATSDR 2004        |                         |                                     |                           |                             |            | [20]                     |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Hematologic, Systemic       | 10                          | Nejad, 2014        | Immune                       | 10                           | Nejad, 2014         | 2007-08-01           | 2019-10-22         | 6161                                           | 13                                              | 287                                            | 2                                                 |

## Other Health Data

| Data Element                                | Value         | Units             | Source    | Notes |
|---------------------------------------------|---------------|-------------------|-----------|-------|
| <b>Measured Data and Assessment Results</b> |               |                   |           |       |
| Chronic inhalation Minimal Risk Level (MRL) | 0.0001        | mg/m <sup>3</sup> | CDC ATSDR |       |
| Inhalation Unit Risk (IUR)                  | 9             | ug/m <sup>3</sup> | EPA PPRTV |       |
| Intermediate Minimal Risk Level (MRL)       | 0.01          | mg/kg/day         | CDC ATSDR |       |
| Reference Concentration (RfC)               | 0.000006      | mg/m <sup>3</sup> | EPA PPRTV |       |
| Subchronic Provisional RfD                  | 0.003         | mg/kg/day         | EPA PPRTV |       |
| Subchronic RfC                              | 0.00002       | mg/m <sup>3</sup> | EPA PPRTV |       |
| Cancer Classification (CC)                  | 2B            | no units          | WHO IARC  |       |
| Cancer Classification (CC)                  | 2B            | no units          | WHO IARC  |       |
| Cancer Classification (CC)                  | Female.Mice P | no units          | HHS NTP   |       |
| Cancer Classification (CC)                  | Female.Rats P | no units          | HHS NTP   |       |
| Cancer Classification (CC)                  | Male.Mice P   | no units          | HHS NTP   |       |
| Cancer Classification (CC)                  | Male.Rats P   | no units          | HHS NTP   |       |

| Data Element                                | Value | Units | Source   | Notes |
|---------------------------------------------|-------|-------|----------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |          |       |
| LD50                                        | 6171  | mg/kg | NIH HSDB |       |

| Data Element             | Value | Units | Source    | Notes |
|--------------------------|-------|-------|-----------|-------|
| <b>Modeled Data</b>      |       |       |           |       |
| LD50                     |       |       | TEST QSAR |       |
| Ames mutagenicity test   |       |       | TEST QSAR |       |
| Developmental toxin test |       |       | TEST QSAR |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

## Cobalt

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 | 4,922                               | 247                  | Sites                 | 5.02                    | 1                          | 1.8                       | 5.2                          | 1097.099                   | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 | 989                                 | 3                    | Sites                 | 0.3                     | 6                          | 10                        | 10                           | 11                         | ug/L        |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 7,630                               | 5,028                | Sites                 | 66                      | 0.007                      | 0.151                     | 1.55                         | 684                        | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 466                                 | 137                  | Sites                 | 29                      | 0.02                       | 0.167                     | 1.03                         | 53.2                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 7,164                               | 4,891                | Sites                 | 68                      | 0.007                      | 0.147                     | 1.64                         | 684                        | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) | 38                  | 240,271                       | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) | 10M - 50M                    |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 70                                  | 33                   | Sites                  | 47                      | 0.002                      | 0.108                     | 0.3                          | 1.07                       | ug/L        |       |
| Bradley et al. 2018 (Finished) [53]                           | 2016        | 26                                  | 12                   | Sites                  | 46                      | 0.04                       | 0.11                      | 0.147                        | 0.18                       | ug/L        |       |
| Community Water System Survey (CWSS) (Finished) [178]         | 2006        | 1                                   | NA                   | Sites                  |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 139                                 | 47                   | Sites                  | 34                      | 0.009                      | 0.166                     | 2.1                          | 29                         | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 1,272                               | 1,167                | Sites                  | 92                      | 0.005                      | 0.21                      | 1.5                          | 508                        | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 4,565                               | 2,769                | Sites                  | 61                      | 0.007                      | 0.129                     | 2.88                         | 1230                       | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 5,825                               | 3,934                | Sites                  | 68                      | 0.005                      | 0.19                      | 1.95                         | 1230                       | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                             | 2012 - 2013 | 757                                 | 602                  | Sites                  | 80                      | 0.022                      | 0.0775                    | 0.881                        | 52.4                       | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water                              | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg-<br>bw/day) | Notes |
|----------------------------------------------------|------|------------------------------------------------|-------|
| Expcast exposure                                   |      |                                                |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) | 0.28                            | ug/l  |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 20               | ATSDR. 2004. Toxicological Profile for Cobalt. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                                                                                                                                                                         |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. Environmental science & technology, 52(23), 13972-13985.                                                                                |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                                                                                                                                                              |
| 294              | USEPA. 2008. Provisional Peer Reviewed Toxicity Values for Cobalt (CASRN 7440-48-4). EPA/690/R-08/008F. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH.                                                                                                                                    |

**Cotinine**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                |
|-----------------|--------------------------------|
| Name:           | Cotinine                       |
| CASRN:          | 486-56-6                       |
| DTXSID:         | <a href="#">DTXSID1047576</a>  |
| Use:            | Urinary metabolite of nicotine |
| Chemical Notes: |                                |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxics                                 |  |
| PubMed Neurotoxics                                |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 |                            |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity | Prevalence | Magnitude |
|---------|----------|------------|-----------|
|         |          | 9          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect | Target Pop. | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------|-------------|-------------------|----------------------|
|                                                          |                        |                 |             |                   |                      |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.1058                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                             |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-----------------------------------|
|              |       |       |                   |                |                 |                   |                             |            |                          | NOTE: No health assessments found |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      | 2020-04-06         | 4070                                           | 9                                               | 129                                            | 0                                                 |

## Other Health Data

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| Percent of active toxcast in vitro assays tested | 0.6   | percent | EPA Chemistry Dashboard |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0026363 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.336     | no units | TEST QSAR |       |
| Developmental toxin test | 0.642     | no units | TEST QSAR |       |

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OCCURRENCE DATA

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## Scoring Data

| Nationally Representative Water Data                           |  | Date             | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples                                 | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects)     | 90th Percentile (Detects)                          | Maximum Conc. (Detects) | Conc. Units                  | Notes |
|----------------------------------------------------------------|--|------------------|-------------------------------|-------------------|----------------------------------------------------|----------------------|-------------------------|----------------------------|----------------------------------------------------|-------------------------|------------------------------|-------|
| Finished Water                                                 |  |                  |                               | Prevalence        |                                                    |                      |                         | Magnitude                  |                                                    |                         |                              |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               |  | 2018 - 2019      |                               |                   |                                                    |                      |                         |                            |                                                    |                         |                              |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               |  | 2013 - 2015      |                               |                   |                                                    |                      |                         |                            |                                                    |                         |                              |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               |  | 2008 - 2010      |                               |                   |                                                    |                      |                         |                            |                                                    |                         |                              |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               |  | 2001 - 2003      |                               |                   |                                                    |                      |                         |                            |                                                    |                         |                              |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   |  | 1993 - 1997      |                               |                   |                                                    |                      |                         |                            |                                                    |                         |                              |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   |  | 1988 - 1992      |                               |                   |                                                    |                      |                         |                            |                                                    |                         |                              |       |
| National Inorganics and Radionuclides Survey (NIRS)            |  | 1984 - 1986      |                               |                   |                                                    |                      |                         |                            |                                                    |                         |                              |       |
| Ambient Water                                                  |  |                  |                               | Prevalence        |                                                    |                      |                         | Magnitude                  |                                                    |                         |                              |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     |  | 1991 - 2017      | 1,142                         | 64                | Sites                                              | 5.6                  | 0.00027                 | 0.0117                     | 0.106                                              | 0.38                    | ug/L                         |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) |  | 1991 - 2017      | 144                           | 63                | Sites                                              | 44                   | 0.00027                 | 0.012                      | 0.106                                              | 0.38                    | ug/L                         |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  |  | 1991 - 2017      | 998                           | 1                 | Sites                                              | 0.1                  | 0.00506                 | 0.00506                    | 0.00506                                            | 0.00506                 | ug/L                         |       |
| Pesticide Application Data                                     |  | Number of States | Amount Applied (lbs/year)     | Date              | Toxic Release Data                                 |                      | Number of States        | Amount Released (lbs/year) | Chemical Production Data                           |                         | Production Volume (lbs/year) |       |
| Estimated Annual Agricultural Pesticide Use (USGS)             |  |                  |                               |                   | Toxic Release Inventory (TRI) Program (EPA) (2016) |                      |                         |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                         |                              |       |

## Non-Scoring Data

| Non-Nationally Representative Water Data              | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|-------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                 |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Bradley et al. 2018 (Finished) [53]                   | 2016        | 26                            | 4                 | Sites               | 15                   | 0.0010904               | 0.00166                | 0.00235                   | 0.0025508               | ug/L        |       |
| Glassmeyer et al 2017 (Finished) [86]                 | 2007 - 2012 | 25                            | NA                | Sites               | 8                    |                         | 0.011                  |                           | 0.01581                 | ug/L        |       |
| Padhye et al. 2013 (Finished) [155]                   | 2009 - 2010 | 8                             | 1                 | Samples             | 12                   | 0                       | 0                      |                           | 4e-07 +/- 4e-07         | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]         | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| IL EPA (2008) via Uslu et al. (2013) (Finished) [433] | 2008        | NA                            | NA                |                     |                      |                         |                        |                           | 0.006                   | ug/L        |       |
| <b>Ambient Water</b>                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Ambient) [86]                  | 2007 - 2012 | 25                            | NA                | Sites               | 8                    |                         | 0.0153                 |                           | 0.01886                 | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                    | 2012 - 2014 | 38                            | 23                | Sites               | 61                   | 0.0011136               | 0.0173                 | 0.0489                    | 0.0680997               | ug/L        |       |
| Padhye et al. 2013 (Ambient) [155]                    | 2009 - 2010 | 8                             | 2                 | Samples             | 25                   | 0                       | 0                      |                           | 2.7e-06 +/- 4e-07       | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]          | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| IL EPA (2008) via Uslu et al. (2013) (Ambient) [433]  | 2008        | NA                            | NA                |                     |                      |                         |                        |                           | 0.012                   | ug/L        |       |
| <b>Waste Water Effluent</b>                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                  | 2011 - 2017 | 21                            | 21                | Sites               | 100                  | 0.0111602               | 0.042                  | 0.192                     | 0.2647215               | ug/L        |       |
| <b>Estimated Concentration in Water</b>               | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                       |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                                  |      | 0.000000117                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) | 0.388                        | ng/ml |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.34908     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 280.912     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 279.705     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.000289385 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.000944061 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.252783    | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0369828   | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 3.16285     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 2.46604     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.000000115 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 0.190328    | no units                |       |

**Cotinine**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                  |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985. |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922).                                                         |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                              |
| 155              | Padhye, L.P., Yao, H., Kung'u, F.T., and Huang, C.H. Year-long evaluation on the occurrence and fate of pharmaceuticals, personal care products, and endocrine disrupting chemicals in an urban drinking water treatment plant. 2014. <i>Water Research</i> 51 (2014) 266-276.                                                                                  |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                                                                |
| 433              | Uslu, M., Jasim, S., Arvai, A., Bewtra, J. and Biswas, N., 2013. A Survey of Occurrence and Risk Assessment of Pharmaceutical Substances in the Great Lakes Basin. <i>Ozone: Science &amp; Engineering</i> , 35(4), pp.249-262.                                                                                                                                 |

**Cumene**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Cumene                        |
| CASRN:          | 98-82-8                       |
| DTXSID:         | <a href="#">DTXSID1021827</a> |
| Use:            |                               |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxics                                 | X |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.0054                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 4       | non-cancer effects | 4          | 6         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                  | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 600                    | increased average kidney weights | general population | IRIS              | 1997                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 3.24                         | 90th Percentile                               | Finished Water                       | UCM1   | 1988-1992 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Cumene

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study   | Critical Effect                 | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|------------------|---------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.1   | mg/kg/day | IRIS 1997         | Wolf et al. 1956 | increased average kidney weight | general population | 33.8                        | 592        | [225]                    |       |
| Reference Dose (RfD) or Equivalent | 0.1   | mg/kg/day | WHO 1999          | Wolf et al. 1956 | increased average kidney weight | general population | 33.8                        | 592        | [436]                    |       |
| Cancer Classification (CC)         | D     |           | IRIS 1997         |                  |                                 |                    |                             |            | [225]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     | 2001-09-01           | 2020-04-14         | 480                                            | 0                                               | 4                                              |                                                   |

## Other Health Data

| Data Element                                | Value          | Units             | Source         | Notes |
|---------------------------------------------|----------------|-------------------|----------------|-------|
| <b>Measured Data and Assessment Results</b> |                |                   |                |       |
| 10-day Health Advisory                      | 11             | mg/L              | EPA DWSHA 2018 |       |
| Chronic Health-Based Guidance Value         | 0.3            | mg/L              | MN DOH         |       |
| Reference Concentration (RFC)               | 0.4            | mg/m <sup>3</sup> | EPA IRIS       |       |
| Cancer Classification (CC)                  | 2B             | no units          | WHO IARC       |       |
| Cancer Classification (CC)                  | Female.Mice P  | no units          | HHS NTP        |       |
| Cancer Classification (CC)                  | Female.Rats SE | no units          | HHS NTP        |       |
| Cancer Classification (CC)                  | Male.Mice CE   | no units          | HHS NTP        |       |
| Cancer Classification (CC)                  | Male.Rats CE   | no units          | HHS NTP        |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 1400  | mg/kg   | NIH HSDB                | min   |
| LD50                                             | 2910  | mg/kg   | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 5.96  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value    | Units    | Source    | Notes |
|--------------------------|----------|----------|-----------|-------|
| <b>Modeled Data</b>      |          |          |           |       |
| LD50                     | 0.020893 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.04     | no units | TEST QSAR |       |
| Developmental toxin test | 0.5      | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Cumene  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date                    | Number of PWS/ Sites/ Samples    | Number of Detects | PWS/ Sites/ Samples                                | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects)  | 90th Percentile (Detects)         | Maximum Conc. (Detects)                            | Conc. Units | Notes                               |
|----------------------------------------------------------------|-------------------------|----------------------------------|-------------------|----------------------------------------------------|----------------------|-------------------------|-------------------------|-----------------------------------|----------------------------------------------------|-------------|-------------------------------------|
| <b>Finished Water</b>                                          |                         |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997             | 22,995                           | 56                | Sites                                              | 0.24                 | 0.1                     | 0.6                     | 2.58                              | 15                                                 | ug/L        |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992             | 12,771                           | 35                | Sites                                              | 0.27                 | 0.01                    | 0.9                     | 3.24                              | 6                                                  | ug/L        |                                     |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| <b>Ambient Water</b>                                           |                         |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017             | 6,831                            | 75                | Sites                                              | 1.1                  | 0.005                   | 0.03                    | 3.5                               | 27                                                 | ug/L        |                                     |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017             | 277                              | 14                | Sites                                              | 5.05                 | 0.005                   | 0.2                     | 3.5                               | 3.8                                                | ug/L        |                                     |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017             | 6,554                            | 61                | Sites                                              | 0.93                 | 0.005                   | 0.0285                  | 3.76                              | 27                                                 | ug/L        |                                     |
| <b>Pesticide Application Data</b>                              | <b>Number of States</b> | <b>Amount Applied (lbs/year)</b> | <b>Date</b>       | <b>Toxic Release Data</b>                          |                      |                         | <b>Number of States</b> | <b>Amount Released (lbs/year)</b> | <b>Chemical Production Data</b>                    |             | <b>Production Volume (lbs/year)</b> |
| Estimated Annual Agricultural Pesticide Use (USGS)             |                         |                                  |                   | Toxic Release Inventory (TRI) Program (EPA) (2016) |                      |                         | 41                      | 924,489                           | Chemical Data Reporting (CDR) Results (EPA) (2016) |             | 5B - 10B                            |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 9                             | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 846                           | 17                | Sites               | 2.01                 | 0.01                    | 0.01                   | 0.09                      | 1.77                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 3,434                         | 34                | Sites               | 0.99                 | 0.01                    | 0.0355                 | 0.83                      | 39.6                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 4,277                         | 51                | Sites               | 1.19                 | 0.01                    | 0.0245                 | 0.8                       | 39.6                    | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 9                             | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Arnold et al. 2016 (Unfiltered) [7]                           | 2012 - 2013 | 158                           | 1                 | Sites               | 0.63                 | 0.064                   | 0.064                  | 0.064                     | 0.064                   | ug/L        |       |
| Southeast Stream Quality Assessment (SESQA) (Ambient) [102]   | 2014        | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Southeast Stream Quality Assessment (SESQA) (Ambient) [102]   | 2014        | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                             | 1                 | Sites               | 50                   |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                   |      | 0.000106                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) | < LOD                        | ng/ml |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 12.7811     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 157.394     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 160.61      | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 3.23017     | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 2.95121     | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000517581 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000954993 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 48.173      | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 239.43      | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.00860044  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 3.82156     | no units                |       |

**Cumene**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. Science of The Total Environment. v581-582, (909-922).                                                                                                                                    |
| 102              | <a href="https://webapps.usgs.gov/rsqa/#!/region/SESQA">https://webapps.usgs.gov/rsqa/#!/region/SESQA</a>                                                                                                                                                                                                                                                                                                                          |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. Science of the Total Environment, 636, 69-79.                                                                                                                                           |
| 225              | USEPA. 1997. Chemical Assessment Summary, Cumene. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, D.C.                                                                                                                                                                                                                                  |
| 436              | WHO. 1999. Concise International Chemical Assessment Document 18, Cumene. World Health Organization (WHO), Geneva, Switzerland.                                                                                                                                                                                                                                                                                                    |

**Cycloate**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                                                  |
|-----------------|--------------------------------------------------------------------------------------------------|
| Name:           | Cycloate                                                                                         |
| CASRN:          | 1134-23-2                                                                                        |
| DTXSID:         | <a href="#">DTXSID6032356</a>                                                                    |
| Use:            | Herbicide for annual grasses, nutgrass, many broadleafweeds in sugar beets, table beets, spinach |
| Chemical Notes: |                                                                                                  |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.038                      |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 7       | non-cancer effects | 2          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                      | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 3                      | spinal nerve axonal atrophy and femoral nerve alterations in females | general population | OPP               | 2015                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.1139                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



## Cycloate

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study      | Critical Effect                                                      | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|---------------------|----------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0005 | mg/kg/day | OPP 2015          | Sprague et al. 1984 | spinal nerve axonal atrophy and femoral nerve alterations in females | general population | 33.8                        | 2.96       | [339]                    |       |
| Cancer Classification (CC)         | NL     |           | OPP 2015          |                     |                                                                      |                    |                             |            | [339]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 0.45  | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.067 | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.03  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.03  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.005 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 1275      | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 4175      | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 175       | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 3.0999999 | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 0.5       | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 75        | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 2.32      | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0067608 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.352     | no units | TEST QSAR |       |
| Developmental toxin test | 0.445     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Cycloate  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

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Scoring Data

| Nationally Representative Water Data                                                   | Date                    | Number of PWS/ Sites/ Samples        | Number of Detects        | PWS/Sites/ Samples                                 | Percent with Detects        | Minimum Conc. (Detects)        | Median Conc. (Detects)        | 90th Percentile (Detects)         | Maximum Conc. (Detects)                            | Conc. Units        | Notes        |
|----------------------------------------------------------------------------------------|-------------------------|--------------------------------------|--------------------------|----------------------------------------------------|-----------------------------|--------------------------------|-------------------------------|-----------------------------------|----------------------------------------------------|--------------------|--------------|
| <b>Finished Water</b>                                                                  |                         |                                      |                          |                                                    |                             |                                |                               |                                   |                                                    |                    |              |
| Unregulated Contaminant Monitoring Rule (UCMR) 4                                       | 2018 - 2019             |                                      |                          |                                                    |                             |                                |                               |                                   |                                                    |                    |              |
| Unregulated Contaminant Monitoring Rule (UCMR) 3                                       | 2013 - 2015             |                                      |                          |                                                    |                             |                                |                               |                                   |                                                    |                    |              |
| Unregulated Contaminant Monitoring Rule (UCMR) 2                                       | 2008 - 2010             |                                      |                          |                                                    |                             |                                |                               |                                   |                                                    |                    |              |
| Unregulated Contaminant Monitoring Rule (UCMR) 1                                       | 2001 - 2003             |                                      |                          |                                                    |                             |                                |                               |                                   |                                                    |                    |              |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2                           | 1993 - 1997             |                                      |                          |                                                    |                             |                                |                               |                                   |                                                    |                    |              |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1                           | 1988 - 1992             |                                      |                          |                                                    |                             |                                |                               |                                   |                                                    |                    |              |
| National Inorganics and Radionuclides Survey (NIRS)                                    | 1984 - 1986             |                                      |                          |                                                    |                             |                                |                               |                                   |                                                    |                    |              |
| <b>Ambient Water</b>                                                                   |                         |                                      |                          |                                                    |                             |                                |                               |                                   |                                                    |                    |              |
| National Water Quality Assessment (USGS NAWQA) (All Water)                             | 1991 - 2017             | 2,751                                | 4                        | Sites                                              | 0.15                        | 0.009                          | 0.02                          | 0.114                             | 0.48                                               | ug/L               |              |
| National Water Quality Assessment (USGS NAWQA) (Surface Water)                         | 1991 - 2017             | 221                                  | 4                        | Sites                                              | 1.81                        | 0.009                          | 0.02                          | 0.114                             | 0.48                                               | ug/L               |              |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)                          | 1991 - 2017             | 2,530                                | 0                        | Sites                                              | 0                           |                                |                               |                                   |                                                    |                    |              |
| <b>Pesticide Application Data</b>                                                      | <b>Number of States</b> | <b>Amount Applied (lbs/year)</b>     | <b>Date</b>              | <b>Toxic Release Data</b>                          |                             |                                | <b>Number of States</b>       | <b>Amount Released (lbs/year)</b> | <b>Chemical Production Data</b>                    |                    |              |
| Estimated Annual Agricultural Pesticide Use (USGS)                                     | 2                       | 48,166                               | 2016                     | Toxic Release Inventory (TRI) Program (EPA) (2016) |                             |                                | 1                             | 10                                | Chemical Data Reporting (CDR) Results (EPA) (2016) |                    |              |
| <b>Non-Nationally Representative Water Data</b>                                        | <b>Date</b>             | <b>Number of PWS/ Sites/ Samples</b> | <b>Number of Detects</b> | <b>PWS/ Sites/ Samples</b>                         | <b>Percent with Detects</b> | <b>Minimum Conc. (Detects)</b> | <b>Median Conc. (Detects)</b> | <b>90th Percentile (Detects)</b>  | <b>Maximum Conc. (Detects)</b>                     | <b>Conc. Units</b> | <b>Notes</b> |
| <b>Finished Water</b>                                                                  |                         |                                      |                          |                                                    |                             |                                |                               |                                   |                                                    |                    |              |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020             | 3                                    | 0                        | Sites                                              | 0                           |                                |                               |                                   |                                                    |                    |              |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013             | 13                                   | 0                        | Sites                                              | 0                           |                                |                               |                                   |                                                    |                    |              |
| <b>Ambient Water</b>                                                                   |                         |                                      |                          |                                                    |                             |                                |                               |                                   |                                                    |                    |              |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020             | 16                                   | 0                        | Sites                                              | 0                           |                                |                               |                                   |                                                    |                    |              |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017             | 363                                  | 2                        | Sites                                              | 0.55                        | 0.0016                         | 0.03                          | 0.0986                            | 0.128                                              | ug/L               |              |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017             | 621                                  | 0                        | Sites                                              | 0                           |                                |                               |                                   |                                                    |                    |              |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017             | 984                                  | 2                        | Sites                                              | 0.2                         | 0.0016                         | 0.03                          | 0.0986                            | 0.128                                              | ug/L               |              |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013             | 121                                  | 0                        | Sites                                              | 0                           |                                |                               |                                   |                                                    |                    |              |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013             | 114                                  | 0                        | Sites                                              | 0                           |                                |                               |                                   |                                                    |                    |              |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013             | 8                                    | 0                        | Sites                                              | 0                           |                                |                               |                                   |                                                    |                    |              |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018             | 180                                  | 31                       | Sites                                              | 17                          | 0.0136                         | 0.105                         | 0.306                             | 0.601                                              | ug/L               |              |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014             | 38                                   | 1                        | Sites                                              | 2.63                        | 0.0287                         | 0.0287                        | 0.0287                            | 0.0287                                             | ug/L               |              |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013             | 106                                  | 0                        | Sites                                              | 0                           |                                |                               |                                   |                                                    |                    |              |
| <b>Waste Water Effluent</b>                                                            |                         |                                      |                          |                                                    |                             |                                |                               |                                   |                                                    |                    |              |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b>             | <b>Source</b>                        | <b>Value</b>             | <b>Units</b>                                       | <b>Model</b>                | <b>Notes</b>                   |                               |                                   |                                                    |                    |              |
|                                                                                        |                         |                                      |                          |                                                    |                             |                                |                               |                                   |                                                    |                    |              |

| Predicted Exposure Data (EPA CompTox Dashboard)     | Date                         | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|-----------------------------------------------------|------------------------------|-----------------------------------------|-------|
| Expocast exposure                                   |                              | 8.41E-08                                |       |
| Biomonitoring Data                                  | Detection at 90th Percentile | Units                                   | Notes |
| NHANES biomonitoring detection in serum (1999-2016) |                              |                                         |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |                                         |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |                                         |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 2.66986     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 253.174     | degree C                |       |
| Boiling point                                                  | TEST QSAR  |             |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 0.0017037   | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.00480839  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000321829 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00052723  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 44.9671     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 27.1019     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000000169 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.79283     | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 339              | USEPA. 2015. Cycloate. Human Health Scoping Document in Support of Registration Review. EPA-HQ-OPP-2015-0288-0008. DP No. D424437. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                      |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**Cyfluthrin**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Cyfluthrin                    |
| CASRN:          | 68359-37-5                    |
| DTXSID:         | <a href="#">DTXSID5035957</a> |
| Use:            | Insecticide; medication       |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.74                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 6       | reproductive and developmental effects | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect        | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 5                      | reduced motor activity | bottle-fed infants | OPP               | 2017                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|------|
| 3.677                        |                                               | EDWC SW (acute)                      | OPP    | 2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Cyfluthrin

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study       | Critical Effect        | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|----------------------|------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0039 | mg/kg/day | OPP 2017          | Wolansky et al. 2006 | reduced motor activity | bottle-fed infants | 151                         | 5.17       | [379]                    |       |
| Cancer Classification (CC)         | NL     |           | OPP 2017          |                      |                        |                    |                             |            | [379]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 0.1   | mg/L      | EPA HHBP                                |       |
| Acute Human Health Benchmark                | 0.1   | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.02  | mg/kg/day | EPA HHBP                                |       |
| Acute PAD                                   | 0.02  | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.15  | mg/L      | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.15  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.15  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.024 | mg/kg/day | EPA HHBP                                |       |
| Population-Adjusted Dose (PAD)              | 0.024 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| Inhalation LOAEL                                 | 0.14      | mg/L      | EPA Toxicity Reference Database | max   |
| Inhalation LOAEL                                 | 0.0011013 | mg/L      | EPA Toxicity Reference Database | min   |
| Inhalation NOAEL                                 | 0.0011013 | mg/L      | EPA Toxicity Reference Database | min   |
| Inhalation NOAEL                                 | 0.0259    | mg/L      | EPA Toxicity Reference Database | max   |
| LD50                                             | 140       | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 500       | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 114.8     | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 9         | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 3         | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 38.4      | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 8.29      | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 13.9      | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 38.900002 | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 10.9      | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 2.5       | mg/kg/day | EPA Toxicity Reference Database | min   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0015311 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.002     | no units | TEST QSAR |       |
| Developmental toxin test | 0.873     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Cyfluthrin  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

July 2021

Scoring Data

| Nationally Representative Water Data                           | Date                    | Number of PWS/ Sites/ Samples    | Number of Detects | PWS/Sites/ Samples                                 | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects)  | 90th Percentile (Detects)         | Maximum Conc. (Detects)                            | Conc. Units | Notes                               |
|----------------------------------------------------------------|-------------------------|----------------------------------|-------------------|----------------------------------------------------|----------------------|-------------------------|-------------------------|-----------------------------------|----------------------------------------------------|-------------|-------------------------------------|
| <b>Finished Water</b>                                          |                         |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| <b>Ambient Water</b>                                           |                         |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017             | 3,675                            | 0                 | Sites                                              | 0                    |                         |                         |                                   |                                                    |             |                                     |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017             | 383                              | 0                 | Sites                                              | 0                    |                         |                         |                                   |                                                    |             |                                     |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017             | 3,292                            | 0                 | Sites                                              | 0                    |                         |                         |                                   |                                                    |             |                                     |
| <b>Pesticide Application Data</b>                              | <b>Number of States</b> | <b>Amount Applied (lbs/year)</b> | <b>Date</b>       | <b>Toxic Release Data</b>                          |                      |                         | <b>Number of States</b> | <b>Amount Released (lbs/year)</b> | <b>Chemical Production Data</b>                    |             | <b>Production Volume (lbs/year)</b> |
| Estimated Annual Agricultural Pesticide Use (USGS)             | 48                      | 279,251                          | 2016              | Toxic Release Inventory (TRI) Program (EPA) (2016) |                      |                         | 2                       | 21                                | Chemical Data Reporting (CDR) Results (EPA) (2016) |             |                                     |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects                                                | Minimum Conc. (Detects)                                                                                                                                                                                                                                                                                                                   | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                                                                     |                                                                                                                                                                                                                                                                                                                                           |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 0                 | Sites               | 0                                                                   |                                                                                                                                                                                                                                                                                                                                           |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                                                                   |                                                                                                                                                                                                                                                                                                                                           |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                                                                     |                                                                                                                                                                                                                                                                                                                                           |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 576                           | 1                 | Sites               | 0.17                                                                | 0.098                                                                                                                                                                                                                                                                                                                                     | 0.098                  | 0.098                     | 0.098                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 2,014                         | 1                 | Sites               | 0.05                                                                | 0.015                                                                                                                                                                                                                                                                                                                                     | 0.015                  | 0.015                     | 0.015                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 2,589                         | 2                 | Sites               | 0.08                                                                | 0.015                                                                                                                                                                                                                                                                                                                                     | 0.0565                 | 0.0814                    | 0.098                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 201                           | 0                 | Sites               | 0                                                                   |                                                                                                                                                                                                                                                                                                                                           |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 190                           | 0                 | Sites               | 0                                                                   |                                                                                                                                                                                                                                                                                                                                           |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 0                 | Sites               | 0                                                                   |                                                                                                                                                                                                                                                                                                                                           |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 4,669                         | 343               | Sites               | 7.35                                                                | 0.000838                                                                                                                                                                                                                                                                                                                                  | 0.0082                 | 0.0322                    | 3.4                     | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 7                 | Sites               | 18                                                                  | 0.000263                                                                                                                                                                                                                                                                                                                                  | 0.000548               | 0.000831                  | 0.000964                | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 106                           | 0                 | Sites               | 0                                                                   |                                                                                                                                                                                                                                                                                                                                           |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                                                                   |                                                                                                                                                                                                                                                                                                                                           |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                                                                     |                                                                                                                                                                                                                                                                                                                                           |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>                                                        | <b>Notes</b>                                                                                                                                                                                                                                                                                                                              |                        |                           |                         |             |       |
| Estimated Drinking Water Concentration (EDWC) in Surface Water (acute)                 | 2017        | OPP                           | 3.677             | ug/L                | Tier I, FOQA Index Reservoir Screening Tool (FIRST) Model (alfalfa) | The critical effect of reduced motor activity was based on an acute population adjusted dose and is considered a less-than-chronic response. To account for this, the modeled surface water acute concentration found in the most recent available EPA OPP health assessment was selected as the occurrence concentration for cyfluthrin. |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.0000019                               |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.35028     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 424.382     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 442.743     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 3.81E-10    | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 6.1E-10     | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000000029 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 5.37E-08    | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 414.928     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 928.966     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 4.42E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 6.08154     | no units                |       |

**Cyfluthrin**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 379              | USEPA. 2017. Cyfluthrin and Beta-Cyfluthrin: Acute and Chronic Aggregate Dietary (Food and Drinking Water) Exposure and Risk Assessment for Registration Review. EPA-HQ-OPP-2010-0684-0101. DP No. D435057. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                             |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

## Cyhalothrin

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Cyhalothrin                   |
| CASRN:          | 68085-85-8                    |
| DTXSID:         | <a href="#">DTXSID6023997</a> |
| Use:            | Insecticide                   |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              | X |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 |                            |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 6       | reproductive and developmental effects |            |           |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect        | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 1                      | reduced motor activity | bottle-fed infants | OPP               | 2017                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|------|
|                              |                                               |                                      |        |      |

## PUBLIC NOMINATION STATUS

|                   |
|-------------------|
| Public Nomination |
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value   | Units     | Assessment Source | Critical Study    | Critical Effect        | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|---------|-----------|-------------------|-------------------|------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.00093 | mg/kg/day | OPP 2017          | Moser et al. 2016 | reduced motor activity | bottle-fed infants | 151                         | 1.23       | [385]                    |       |
| Cancer Classification (CC)         | NL      |           | OPP 2017          |                   |                        |                    |                             |            | [385]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 0.03  | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.005 | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.006 | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.006 | mg/L      | Health-based screening levels from USGS |       |
| Intermediate Minimal Risk Level (MRL)       | 0.01  | mg/kg/day | CDC ATSDR                               |       |
| Population-Adjusted Dose (PAD)              | 0.001 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 20    | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 5000  | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 5     | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 75    | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 1.5   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 15    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 13.19 | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 12.5  | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic LOAEL                                 | 2.5   | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 1     | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 2.5   | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value | Units | Source    | Notes |
|--------------------------|-------|-------|-----------|-------|
| <b>Modeled Data</b>      |       |       |           |       |
| LD50                     |       |       | TEST QSAR |       |
| Ames mutagenicity test   |       |       | TEST QSAR |       |
| Developmental toxin test |       |       | TEST QSAR |       |

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## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                                             | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects)                                                                                                                                                                                                                                                      | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|--------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                |             |                               |                   |                     |                      |                                                                                                                                                                                                                                                                              |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                         | 2001 - 2013 | 10                            | 0                 | Sites               | 0                    |                                                                                                                                                                                                                                                                              |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                 |             |                               |                   |                     |                      |                                                                                                                                                                                                                                                                              |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)               | 2001 - 2013 | 123                           | 0                 | Sites               | 0                    |                                                                                                                                                                                                                                                                              |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                      | 2001 - 2013 | 113                           | 0                 | Sites               | 0                    |                                                                                                                                                                                                                                                                              |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                        | 2001 - 2013 | 10                            | 0                 | Sites               | 0                    |                                                                                                                                                                                                                                                                              |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                          |             |                               |                   |                     |                      |                                                                                                                                                                                                                                                                              |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                              | Date        | Source                        | Value             | Units               | Model                | Notes                                                                                                                                                                                                                                                                        |                        |                           |                         |             |       |
| Limit of solubility as a surrogate for occurrence concentration, Surface Water, Peak | 2017        | OPP                           | 5                 | ug/L                |                      | Cyhalothrin is very insoluble in water and residues in drinking water are expected to be very low. Therefore, the limit of solubility of cyhalothrin (5 ppb) reported in the most recent EPA OPP health assessment was used as the occurrence concentration for cyhalothrin. |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.000000177                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.54201     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 422.672     | degree C                |       |
| Boiling point                                                  | TEST QSAR  |             |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 4.02E-09    | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  |             |                         |       |
| Solubility in water                                            | OPERA QSAR | 1.97E-08    | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  |             |                         |       |
| Bioconcentration factor                                        | OPERA QSAR | 133.673     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  |             |                         |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000000012 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 6.63514     | no units                |       |

**Cyhalothrin**

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| Reference<br>Number | Full Reference                                                                                                                                                                                                                                             |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 385                 | USEPA. 2017. Lambda- & Gamma-Cyhalothrin: Human Health Draft Risk Assessment for Registration Review. EPA-HQ-OPP-2010-0480-0299. DP No. 426321. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C. |

**Cypermethrin**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                    |
|-----------------|------------------------------------|
| Name:           | Cypermethrin                       |
| CASRN:          | 52315-07-8                         |
| DTXSID:         | <a href="#">DTXSID1023998</a>      |
| Use:            | Insecticide; veterinary medication |
| Chemical Notes: |                                    |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 | X |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 | X |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.00052                    |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 5       | reproductive and developmental effects | 2          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect        | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 30                     | reduced motor activity | bottle-fed infants | OPP               | 2017                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0155                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Cypermethrin

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study       | Critical Effect        | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------------|------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.024 | mg/kg/day | OPP 2017          | Wolansky et al. 2006 | reduced motor activity | bottle-fed infants | 151                         | 31.8       | [380]                    |       |
| Cancer Classification (CC)         | C     |           | OPP 2017          |                      |                        |                    |                             |            | [380]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 0.15  | mg/L      | EPA HHBP                                |       |
| Acute Human Health Benchmark                | 0.15  | mg/L      | EPA HHBP                                |       |
| Acute Human Health Benchmark                | 0.15  | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.023 | mg/kg/day | EPA HHBP                                |       |
| Acute PAD                                   | 0.023 | mg/kg/day | EPA HHBP                                |       |
| Acute PAD                                   | 0.023 | mg/kg/day | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.15  | mg/L      | Health-based screening levels from USGS |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 14.9      | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 7180      | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 450       | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 5         | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 1         | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 100       | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 10.78     | percent   | EPA Chemistry Dashboard         | max   |
| Percent of active toxcast in vitro assays tested | 5.96      | percent   | EPA Chemistry Dashboard         | min   |
| Subchronic LOAEL                                 | 28.200001 | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 37        | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 16.3      | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 34.3      | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0017298 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.163     | no units | TEST QSAR |       |
| Developmental toxin test | 0.877     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
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EPA - Office of Water

Cypermethrin  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date                    | Number of PWS/ Sites/ Samples    | Number of Detects | PWS/Sites/ Samples                                 | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects)  | 90th Percentile (Detects)         | Maximum Conc. (Detects)                            | Conc. Units | Notes                               |
|----------------------------------------------------------------|-------------------------|----------------------------------|-------------------|----------------------------------------------------|----------------------|-------------------------|-------------------------|-----------------------------------|----------------------------------------------------|-------------|-------------------------------------|
| <b>Finished Water</b>                                          |                         |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| <b>Ambient Water</b>                                           |                         |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017             | 3,675                            | 5                 | Sites                                              | 0.14                 | 0.006                   | 0.009                   | 0.0155                            | 0.018                                              | ug/L        |                                     |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017             | 383                              | 4                 | Sites                                              | 1.04                 | 0.006                   | 0.011                   | 0.016                             | 0.018                                              | ug/L        |                                     |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017             | 3,292                            | 1                 | Sites                                              | 0.03                 | 0.009                   | 0.009                   | 0.009                             | 0.009                                              | ug/L        |                                     |
| <b>Pesticide Application Data</b>                              | <b>Number of States</b> | <b>Amount Applied (lbs/year)</b> | <b>Date</b>       | <b>Toxic Release Data</b>                          |                      |                         | <b>Number of States</b> | <b>Amount Released (lbs/year)</b> | <b>Chemical Production Data</b>                    |             | <b>Production Volume (lbs/year)</b> |
| Estimated Annual Agricultural Pesticide Use (USGS)             | 14                      | 23,804                           | 2016              | Toxic Release Inventory (TRI) Program (EPA) (2016) |                      |                         |                         |                                   | Chemical Data Reporting (CDR) Results (EPA) (2016) |             |                                     |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 15                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 123                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 113                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 10                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 1,129                         | 84                | Sites               | 7.44                 | 0.0017                  | 0.0107                 | 0.0392                    | 0.357                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 3,711                         | 112               | Sites               | 3.02                 | 0.000516                | 0.00825                | 0.0479                    | 1.25293                 | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 106                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Southeast Stream Quality Assessment (SESQA) (Ambient) [102]                            | 2014        | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                                     | 2002 - 2010 | 71                            | 1                 | Samples             | 1.4                  |                         |                        |                           | 0.014                   | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.00000162                              |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.34971     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 424.351     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 445.159     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 4.74E-09    | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 1.12E-09    | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000000368 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 6.27E-08    | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 349.137     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 741.31      | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 1.99E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 6.47753     | no units                |       |

**Cypermethrin**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 102              | <a href="https://webapps.usgs.gov/rsqa/#!/region/SESQA">https://webapps.usgs.gov/rsqa/#!/region/SESQA</a>                                                                                                                                                                                                                                                                                                                          |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 380              | USEPA. 2017. Cypermethrin, Zeta-cypermethrin, and Alpha-cypermethrin. Draft Human Health Risk Assessment for Registration Review. EPA-HQ-OPP-2012-0167-0116. DP No. D425964. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                            |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                    |

## Cyprodinil

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                         |
|-----------------|-----------------------------------------|
| Name:           | Cyprodinil                              |
| CASRN:          | 121552-61-2                             |
| DTXSID:         | <a href="#">DTXSID1032359</a>           |
| Use:            | Fungicide used on fruits and vegetables |
| Chemical Notes: |                                         |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.000043                   |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 10         | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                            | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 200                    | histopathological alterations in the liver (spongiosis hepatitis) in males | general population | OPP               | 2015                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.00868                      | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

|                   |
|-------------------|
| Public Nomination |
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



## Cyprodinil

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study   | Critical Effect                                                            | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|------------------|----------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.027 | mg/kg/day | OPP 2015          | Frankhauser 1994 | histopathological alterations in the liver (spongiosis hepatitis) in males | general population | 33.8                        | 160        | [340]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2015          |                  |                                                                            |                    |                             |            | [340]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 10    | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 2     | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.17  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.17  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.027 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 2000      | mg/kg     | NIH HSDB                        |       |
| LOAEL                                            | 1000      | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 35.599998 | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 200       | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 3.22      | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 23.88     | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 18.950001 | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 559.65997 | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 231.93    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 3.24      | mg/kg/day | EPA Toxicity Reference Database | min   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0048865 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.679     | no units | TEST QSAR |       |
| Developmental toxin test | 0.516     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Cyprodinil  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

July 2021

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 14                            | 2                 | Sites              | 14                   | 0.0066                  | 0.0079                 | 0.00868                   | 0.0092                  | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 14                            | 2                 | Sites              | 14                   | 0.0066                  | 0.0079                 | 0.00868                   | 0.0092                  | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 31               | 271,518                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 132                           | 16                | Sites               | 12                   | 2.00E - 04              | 0.0092                 | 0.0764                    | 0.111                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 3                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 135                           | 16                | Sites               | 12                   | 2.00E - 04              | 0.0092                 | 0.0764                    | 0.111                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 259                           | 15                | Sites               | 5.79                 | 0.0091                  | 0.034                  | 0.125                     | 0.144                   | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 1                 | Sites               | 2.63                 | 0.0334                  | 0.0334                 | 0.0334                    | 0.0334                  | ug/L        |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 1.36E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 2.93362     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 320.755     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 345.205     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.0000023   | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.00000114  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0000588   | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.000378443 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 29.7556     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 40.5509     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000000025 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.88086     | no units                |       |

**Cyprodinil**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                                                                                          |
| 340              | USEPA. 2015. Cyprodinil. Human Health Risk Assessment for the Expansion of Existing Crop Group/Representative Commodity Uses to Stone Fruit Group 12-12, and Adding New Uses on the Artichoke, Guava, Pomegranate, Passionfruit, Feijoa, Jaboticaba, Wax Jambu, Starfruit, and Acerola and Amended Uses on Greenhouse Cucumbers and Small Tomatoes. EPA-HQ-OPP-2014-0506-0013. DP No. D425998. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C. |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                                                                                                    |

## Desethylatrazine

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                 |
|-----------------|---------------------------------|
| Name:           | Desethylatrazine                |
| CASRN:          | 6190-65-4                       |
| DTXSID:         | <a href="#">DTXSID5037494</a>   |
| Use:            | Degradation product of atrazine |
| Chemical Notes: |                                 |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.0004                     |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 4       | reproductive and developmental effects | 10         | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                          | Target Pop.               | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------|---------------------------|-------------------|----------------------|
| HRL                                                      | 400                    | attenuation of LH surge in females ages 13-49 (estrous cycle disruption) | women of childbearing age | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.16                         | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Desethylatrazine

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study     | Critical Effect                                                          | Target Population         | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|--------------------|--------------------------------------------------------------------------|---------------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.076 | mg/kg/day | OPP 2018          | Cooper et al. 2010 | attenuation of LH surge in females ages 13-49 (estrous cycle disruption) | women of childbearing age | 35.4                        | 429        | [395]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2018          |                    |                                                                          |                           |                             |            | [395]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units  | Source                         | Notes |
|---------------------------------------------|-------|--------|--------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |        |                                |       |
| Maximum Allowable Daily Level               | 100   | ug/day | CalEPA OEHHA Chemical Database |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LOAEL                                            | 100       | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 25        | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 25        | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 5         | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 1.53      | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 35.099998 | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 3.3       | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0072444 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.194     | no units | TEST QSAR |       |
| Developmental toxin test | 0.582     | no units | TEST QSAR |       |

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OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date                    | Number of PWS/ Sites/ Samples    | Number of Detects | PWS/Sites/ Samples                                 | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects)  | 90th Percentile (Detects)         | Maximum Conc. (Detects)                            | Conc. Units | Notes                               |
|----------------------------------------------------------------|-------------------------|----------------------------------|-------------------|----------------------------------------------------|----------------------|-------------------------|-------------------------|-----------------------------------|----------------------------------------------------|-------------|-------------------------------------|
| <b>Finished Water</b>                                          |                         |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| <b>Ambient Water</b>                                           |                         |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017             | 11,386                           | 4,408             | Sites                                              | 39                   | 0.00068                 | 0.023                   | 0.16                              | 6.08                                               | ug/L        |                                     |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017             | 2,318                            | 1,703             | Sites                                              | 73                   | 0.00068                 | 0.025                   | 0.16                              | 6.08                                               | ug/L        |                                     |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017             | 9,069                            | 2,705             | Sites                                              | 30                   | 0.001                   | 0.013                   | 0.165                             | 2.6                                                | ug/L        |                                     |
| <b>Pesticide Application Data</b>                              | <b>Number of States</b> | <b>Amount Applied (lbs/year)</b> | <b>Date</b>       | <b>Toxic Release Data</b>                          |                      |                         | <b>Number of States</b> | <b>Amount Released (lbs/year)</b> | <b>Chemical Production Data</b>                    |             | <b>Production Volume (lbs/year)</b> |
| Estimated Annual Agricultural Pesticide Use (USGS)             |                         |                                  |                   | Toxic Release Inventory (TRI) Program (EPA) (2016) |                      |                         |                         |                                   | Chemical Data Reporting (CDR) Results (EPA) (2016) |             |                                     |

Non-Scoring Data

| Non-Nationally Representative Water Data                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                           | 2001 - 2013 | 17                            | 9                 | Sites               | 53                   | 0.00072                 | 0.0413                 | 0.157                     | 0.928                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                          | 2009 - 2010 | 1                             | 1                 | Sites               | 100                  | 0.006                   | 0.008                  | 0.0216                    | 0.032                   | ug/L        |       |
| <b>Ambient Water</b>                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)          | 2008 - 2017 | 990                           | 688               | Sites               | 69                   | 0.00104                 | 0.04                   | 0.254                     | 3.63                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)            | 2008 - 2017 | 3,239                         | 940               | Sites               | 29                   | 0.00075                 | 0.023                  | 0.18                      | 2.34                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)              | 2008 - 2017 | 4,228                         | 1,628             | Sites               | 39                   | 0.00075                 | 0.0351                 | 0.215                     | 3.63                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated) | 2001 - 2013 | 229                           | 155               | Sites               | 68                   | 0.000716                | 0.031                  | 0.21                      | 1.55                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                        | 2001 - 2013 | 219                           | 149               | Sites               | 68                   | 0.000716                | 0.0208                 | 0.156                     | 1.55                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                          | 2001 - 2013 | 12                            | 7                 | Sites               | 58                   | 0.00072                 | 0.041                  | 0.219                     | 1.3                     | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                     | 2012 - 2014 | 38                            | 26                | Sites               | 68                   | 0.0047                  | 0.0179                 | 0.14                      | 0.851                   | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                      | 2012 - 2013 | 690                           | 115               | Sites               | 17                   | 0.002                   | 0.0276                 | 0.157                     | 0.802                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                           | 2009 - 2010 | 2                             | 2                 | Sites               | 100                  | 0.008                   | 0.024                  | 0.0664                    | 0.114                   | ug/L        |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                     | 2002 - 2010 | 134                           | 21                | Samples             | 16                   |                         |                        |                           | 0.013                   | ug/L        |       |
| <b>Waste Water Effluent</b>                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 6.61E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) | < LOD                        | ug/l  |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.36178     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 330.895     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 323.062     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 6.42E-09    | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000000337 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00132007  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0100925   | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 10.3224     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 3.41979     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 2.43E-08    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 1.56449     | no units                |       |

**Desethylatrazine**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 395              | USEPA. 2018. Atrazine. Draft Human Health Risk Assessment for Registration Review. EPQ-HQ-OPP-2013-0266-1159. DP No. D418316. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                           |

## Desisopropylatrazine

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                 |
|-----------------|---------------------------------|
| Name:           | Desisopropylatrazine            |
| CASRN:          | 1007-28-9                       |
| DTXSID:         | <a href="#">DTXSID0037495</a>   |
| Use:            | Degradation product of atrazine |
| Chemical Notes: |                                 |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.00058                    |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 4       | reproductive and developmental effects | 10         | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                          | Target Pop.               | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------|---------------------------|-------------------|----------------------|
| HRL                                                      | 400                    | attenuation of LH surge in females ages 13-49 (estrous cycle disruption) | women of childbearing age | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.2311                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



## Desisopropylatrazine

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study     | Critical Effect                                                          | Target Population         | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|--------------------|--------------------------------------------------------------------------|---------------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.076 | mg/kg/day | OPP 2018          | Cooper et al. 2010 | attenuation of LH surge in females ages 13-49 (estrous cycle disruption) | women of childbearing age | 35.4                        | 429        | [395]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2018          |                    |                                                                          |                           |                             |            | [395]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units  | Source                         | Notes |
|---------------------------------------------|-------|--------|--------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |        |                                |       |
| Maximum Allowable Daily Level               | 100   | ug/day | CalEPA OEHHA Chemical Database |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LOAEL                                            | 25    | mg/kg/day | EPA Toxicity Reference Database |       |
| NOAEL                                            | 5     | mg/kg/day | EPA Toxicity Reference Database |       |
| Percent of active toxcast in vitro assays tested | 2.65  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 18    | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 3.8   | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0071121 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.08      | no units | TEST QSAR |       |
| Developmental toxin test | 0.372     | no units | TEST QSAR |       |

## Desisopropylatrazine

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 4,489                               | 802                  | Sites                 | 18                      | 0.001                      | 0.0474                    | 0.231                        | 4.44                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                               | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|------------------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                                  |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                           | 2001 - 2013 | 17                                  | 9                    | Sites                  | 53                      | 0.0027                     | 0.0163                    | 0.063                        | 0.469                      | ug/L        |       |
| <b>Ambient Water</b>                                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (All Water)              | 2008 - 2017 | 2,038                               | 374                  | Sites                  | 18                      | 0                          | 0.0441                    | 0.17                         | 2.66                       | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated) | 2001 - 2013 | 229                                 | 68                   | Sites                  | 30                      | 0.0027                     | 0.017                     | 0.19                         | 1.03                       | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                        | 2001 - 2013 | 219                                 | 61                   | Sites                  | 28                      | 0.005162                   | 0.083                     | 0.105                        | 1.03                       | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                          | 2001 - 2013 | 12                                  | 7                    | Sites                  | 58                      | 0.0027                     | 0.0163                    | 0.199                        | 0.776                      | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                      | 2012 - 2013 | 690                                 | 61                   | Sites                  | 8.84                    | 0.0032                     | 0.0224                    | 0.212                        | 0.489                      | ug/L        |       |
| <b>Waste Water Effluent</b>                                            |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water                                       | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expcast exposure                                   |      | 6.57E-08                                      |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) | < LOD                           | ug/l  |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.34468     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 328.615     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 291.377     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 5.11E-09    | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.000000149 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.00268187  | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0161065   | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 10.1928     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 2.23357     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 1.02E-08    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 1.26299     | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 395              | USEPA. 2018. Atrazine. Draft Human Health Risk Assessment for Registration Review. EPQ-HQ-OPP-2013-0266-1159. DP No. D418316. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                           |

**Desvenlafaxine**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                     |
|-----------------|-------------------------------------|
| Name:           | Desvenlafaxine                      |
| CASRN:          | 93413-62-8                          |
| DTXSID:         | <a href="#">DTXSID40869118</a>      |
| Use:            | Medication used to treat depression |
| Chemical Notes: |                                     |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxicants                              |  |
| PubMed Neurotoxicants                             |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.36                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 7       | non-cancer effects | 9          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                               | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 1                      | lowest therapeutic dose: inhibition of serotonin and norepinephrine reuptake/treatment of depressive disorder | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.361                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value       | Units     | Assessment Source  | Critical Study                   | Critical Effect                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                 |
|------------------------------------|-------------|-----------|--------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.0071      | mg/kg/day | FDA 2018; NIH 2018 | Wyeth Pharmaceuticals Inc. 2014b | lowest therapeutic dose -- Developmental (persistent pulmonary hypertension and nervous system effects), gastrointestinal system (nausea, constipation, decreased appetite, weight loss); male reproductive effects (erectile dysfunction, Desvenlafaxine ejaculation failure/disorder, decreased libido), nervous system (effects on serotonin hormone receptor interaction, abnormal dreams, sweating, dizziness, insomnia, mydriasis, blurred/abnormal vision, and neuroendocrine-mediated increases in blood pressure) | bottle-fed infants | 151                         | 9.40                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 0.000208333 | mg/kg/day | FDA 2018; NIH 2018 | Alembic Pharmaceuticals Limited  | lowest therapeutic dose: inhibition of serotonin and norepinephrine reuptake/treatment of depressive disorder                                                                                                                                                                                                                                                                                                                                                                                                              | bottle-fed infants | 151                         | 1.40                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 0.000208333 | mg/kg/day | FDA 2018; NIH 2018 | Alembic Pharmaceuticals Limited  | lowest therapeutic dose: inhibition of serotonin and norepinephrine reuptake/treatment of depressive disorder                                                                                                                                                                                                                                                                                                                                                                                                              | general population | 33.8                        | 4.90                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                            | Value       | Units | Source              | Notes |
|---------------------------------------------------------|-------------|-------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |       |                     |       |
| Acute Health-Based Guidance Value                       | 0.02        | mg/L  | MN DOH              |       |
| Acute Health-Based Guidance Value                       | 0.02        | mg/L  | MN DOH              |       |
| Chronic Health-Based Guidance Value                     | 0.02        | mg/L  | MN DOH              |       |
| Chronic Health-Based Guidance Value                     | 0.02        | mg/L  | MN DOH              |       |
| Screening level for pharmaceutical - general population | 0.004901961 | mg/L  | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.001388889 | mg/L  | EPA Office of Water |       |
| Short-Term/Subchronic Health-Based Guidance Value       | 0.02        | mg/L  | MN DOH              |       |
| Short-Term/Subchronic Health-Based Guidance Value       | 0.02        | mg/L  | MN DOH              |       |

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0027542 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.31      | no units | TEST QSAR |       |
| Developmental toxin test | 0.652     | no units | TEST QSAR |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 557                           | 22                | Sites               | 3.95                 | 0.00072                 | 0.0307                 | 0.361                     | 1.02                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 75                            | 18                | Sites               | 24                   | 0.00072                 | 0.035                  | 0.378                     | 1.02                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 482                           | 4                 | Sites               | 0.83                 | 0.00135                 | 0.00633                | 0.0224                    | 0.0307                  | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 205                           | 87                | Sites               | 42                   | 0.00068                 | 0.0141                 | 0.228                     | 2.09                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 401                           | 6                 | Sites               | 1.5                  | 0.00071                 | 0.00918                | 0.78                      | 0.91                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 606                           | 93                | Sites               | 15                   | 0.00068                 | 0.0138                 | 0.332                     | 2.09                    | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                            | NA                | Sites               | 16                   |                         | 0.0283                 |                           | 0.06043                 | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                            | 22                | Sites               | 58                   | 0.0017892               | 0.0865                 | 0.822                     | 1.953482                | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                       | 2013 - 2015 | 1,106                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                            | 19                | Sites               | 90                   | 0.0930062               | 0.693                  | 1.14                      | 4.4928736               | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      |                                         |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.65547     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 313.112     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 327.611     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 5.09E-08    | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.00000177  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0207862   | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.000695024 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 16.0501     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 73.6207     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000000483 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.58575     | no units                |       |

**Desvenlafaxine**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                  |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. Environmental Science and Technology 53: 2950-2960.                                                   |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. Environmental science & technology, 51(9), 4792-4802.            |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                  |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. Science of The Total Environment. v581-582, (909-922). |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                             |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. Science of the Total Environment, 636, 69-79.        |

**Diazepam**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                      |
|-----------------|--------------------------------------|
| Name:           | Diazepam                             |
| CASRN:          | 439-14-5                             |
| DTXSID:         | <a href="#">DTXSID4020406</a>        |
| Use:            | anxiolytic; skeletal muscle relaxant |
| Chemical Notes: |                                      |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 | X |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.01                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 8       | non-cancer effects | 4          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                     | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 0.1                    | lowest therapeutic dose: anxiolytic, sedative, muscle-relaxant, anticonvulsant and amnestic effects | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.001014                     | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



## Diazepam

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value       | Units     | Assessment Source  | Critical Study | Critical Effect                                                                                     | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                 |
|------------------------------------|-------------|-----------|--------------------|----------------|-----------------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 1.66667E-05 | mg/kg/day | FDA 2018; NIH 2018 | Mayne Pharma   | lowest therapeutic dose: anxiolytic, sedative, muscle-relaxant, anticonvulsant and amnestic effects | bottle-fed infants | 151                         | 0.110                      | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 1.66667E-05 | mg/kg/day | FDA 2018; NIH 2018 | Mayne Pharma   | lowest therapeutic dose: anxiolytic, sedative, muscle-relaxant, anticonvulsant and amnestic effects | general population | 33.8                        | 0.390                      | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                            | Value       | Units     | Source              | Notes |
|---------------------------------------------------------|-------------|-----------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |           |                     |       |
| Cancer Classification (CC)                              | 3           | no units  | WHO IARC            |       |
| Maximum Recommended Daily Dose                          | 0.667       | mg/kg/day | FDA                 |       |
| Screening level for pharmaceutical - general population | 0.000392157 | mg/L      | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.000111111 | mg/L      | EPA Office of Water |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 48    | mg/kg   | NIH HSDB                | min   |
| LD50                                             | 710   | mg/kg   | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 12.77 | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0059979 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.064     | no units | TEST QSAR |       |
| Developmental toxin test | 0.731     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Diazepam  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 556                           | 2                 | Sites               | 0.36                 | 0.00047                 | 0.00081                | 0.00101                   | 0.00115                 | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 75                            | 1                 | Sites               | 1.33                 | 0.00047                 | 0.00047                | 0.00047                   | 0.00047                 | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 481                           | 1                 | Sites               | 0.21                 | 0.00115                 | 0.00115                | 0.00115                   | 0.00115                 | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                         | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Finished) [86]                            | 2007 - 2012 | 25                            | NA                | Sites               | 4                    |                         | 0.00085                |                           | 0.00085                 | ug/L        |       |
| <b>Ambient Water</b>                                             |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)    | 2008 - 2017 | 210                           | 2                 | Sites               | 0.95                 | 0.00035                 | 0.0902                 | 0.144                     | 0.18                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)      | 2008 - 2017 | 401                           | 2                 | Sites               | 0.5                  | 0.00463                 | 0.00577                | 0.00645                   | 0.00691                 | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)        | 2008 - 2017 | 611                           | 4                 | Sites               | 0.65                 | 0.00035                 | 0.00577                | 0.111                     | 0.18                    | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                             | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                               | 2012 - 2014 | 38                            | 6                 | Sites               | 16                   | 0.001681                | 0.00219                | 0.004                     | 0.0047434               | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                          | 2013 - 2015 | 1,106                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Benotti et al. (2009) via Kostich et al. 2010 (Ambient) [127]    | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.00047                 | ug/L        |       |
| Vanderford et al. (2003) via Kostich et al. 2010 (Ambient) [127] | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.0013                  | ug/L        |       |
| Vanderford et al. (2006) via Kostich et al. 2010 (Ambient) [127] | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.0026                  | ug/L        |       |
| <b>Waste Water Effluent</b>                                      |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                             | 2011 - 2017 | 21                            | 17                | Sites               | 81                   | 0.0005702               | 0.0032                 | 0.124                     | 4.77                    | ug/L        |       |
| <b>Estimated Concentration in Water</b>                          | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                   |      | 3.22E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.35313     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 357.022     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 349.282     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 2.09E-08    | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 2.42E-08    | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000162557 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000107152 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 68.2943     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 60.1174     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 2.19E-08    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 2.87833     | no units                |       |

**Diazepam**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                          |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. <i>Environmental Science and Technology</i> 53: 2950-2960.                                                    |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.        |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                          |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922). |
| 127              | Kostich, MS, et al., 2010. Predicting variability of aquatic concentrations of human pharmaceuticals. <i>Sci. Total Environ.</i> 408 (20), 4504e4510.                                                                                                                                                   |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                                     |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.        |

**Diazinon**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                  |
|-----------------|----------------------------------|
| Name:           | Diazinon                         |
| CASRN:          | 333-41-5                         |
| DTXSID:         | <a href="#">DTXSID9020407</a>    |
| Use:            | Pesticide; veterinary medication |
| Chemical Notes: |                                  |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxicants                              | X |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 | X |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.18                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 7       | reproductive and developmental effects | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                  | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.5                    | inhibition of red blood cell acetylcholinesterase in female pups | bottle-fed infants | OPP               | 2016                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.091                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**Diazinon**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value   | Units     | Assessment Source | Critical Study | Critical Effect                                                  | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                                                                               |
|------------------------------------|---------|-----------|-------------------|----------------|------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.00035 | mg/kg/day | OPP 2016          | Parker 2003    | inhibition of red blood cell acetylcholinesterase in female pups | bottle-fed infants | 151                         | 0.464      | [363]                    | NOTE: this compound is a organophosphate pesticide. EPA has created a cumulative risk assessment regarding the common mechanisms of organophosphate |
| Cancer Classification (CC)         | NL      |           | OPP 2016          |                |                                                                  |                    |                             |            | [363]                    | NOTE: this compound is a organophosphate pesticide. EPA has created a cumulative risk assessment regarding the common mechanisms of organophosphate |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                     | Value         | Units             | Source                             | Notes |
|--------------------------------------------------|---------------|-------------------|------------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |               |                   |                                    |       |
| 10-day Health Advisory                           | 0.02          | mg/L              | EPA DWSHA 2018                     |       |
| Acute Minimal Risk Level (MRL)                   | 0.006         | mg/kg/day         | CDC ATSDR                          |       |
| Intermediate Inhalation Minimal Risk Level (MRL) | 0.01          | mg/m <sup>3</sup> | CDC ATSDR                          |       |
| Intermediate Minimal Risk Level (MRL)            | 0.002         | mg/kg/day         | CDC ATSDR                          |       |
| Lifetime Health Advisory                         | 0.001         | mg/L              | EPA DWSHA 2018                     |       |
| Maximum Allowable Concentration (MAC)            | 0.02          | mg/L              | Canadian Drinking Water Guidelines |       |
| Cancer Classification (CC)                       | 2A            | no units          | WHO IARC                           |       |
| Cancer Classification (CC)                       | Female.Mice   | no units          | HHS NTP                            |       |
| Cancer Classification (CC)                       | Female.Rats N | no units          | HHS NTP                            |       |
| Cancer Classification (CC)                       | Male.Mice N   | no units          | HHS NTP                            |       |
| Cancer Classification (CC)                       | Male.Rats N   | no units          | HHS NTP                            |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value  | Units     | Source                          | Notes |
|--------------------------------------------------|--------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |        |           |                                 |       |
| LD50                                             | 1340   | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 2.8    | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 0.02   | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 100    | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 25     | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 0.0037 | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 6.9    | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 0.3    | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 0.04   | mg/kg/day | EPA Toxicity Reference Database |       |
| TD50                                             | 20.4   | mg/kg/day | NIH CPDB                        | min   |
| TD50                                             | 6230   | mg/kg/day | NIH CPDB                        | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0005861 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.26      | no units | TEST QSAR |       |
| Developmental toxin test | 0.609     | no units | TEST QSAR |       |

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OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             |                               | Prevalence        |                    |                      |                         |                        | Magnitude                 |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 | 295                           | 0                 | Sites              | 0                    |                         |                        |                           |                         | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             |                               | Prevalence        |                    |                      |                         |                        | Magnitude                 |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 11,244                        | 995               | Sites              | 8.85                 | 7.00E - 05              | 0.0117                 | 0.091                     | 19                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,229                         | 885               | Sites              | 40                   | 1.00E - 04              | 0.0118                 | 0.0914                    | 3.8                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9,016                         | 110               | Sites              | 1.22                 | 7.00E - 05              | 0.0082                 | 0.0518                    | 19                      | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 12               | 73,164                    | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               | Prevalence        |                     |                      |                         |                        | Magnitude                 |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 173                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 3                 | Sites               | 18                   | 0.00999                 | 0.0345                 | 0.111                     | 0.133                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               | Prevalence        |                     |                      |                         |                        | Magnitude                 |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 1,871                         | 1                 | Sites               | 0.05                 | 0.007                   | 0.007                  | 0.007                     | 0.007                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 1,553                         | 74                | Sites               | 4.76                 | 0.00014                 | 0.008                  | 0.218                     | 1.97                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 3,630                         | 4                 | Sites               | 0.11                 | 0.007                   | 0.094                  | 0.177                     | 0.189                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 5,182                         | 78                | Sites               | 1.51                 | 0.00014                 | 0.00886                | 0.214                     | 1.97                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 3                 | Sites               | 1.31                 | 0.0164                  | 0.0655                 | 0.0943                    | 0.1                     | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 2                 | Sites               | 0.91                 | 0.05                    | 0.0655                 | 0.0779                    | 0.081                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 1                 | Sites               | 8.33                 | 0.0164                  | 0.0582                 | 0.0916                    | 0.1                     | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 19,790                        | 5,003             | Sites               | 25                   | 1e-05                   | 0.042                  | 0.43                      | 331                     | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 3                 | Sites               | 7.89                 | 0.0212                  | 0.0342                 | 0.228                     | 0.276                   | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 1                 | Sites               | 0.14                 | 1e-04                   | 1e-04                  | 1e-04                     | 1e-04                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                                     | 2002 - 2010 | 133                           | 18                | Samples             | 14                   |                         |                        |                           | 0.115                   | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               | Prevalence        |                     |                      |                         |                        | Magnitude                 |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                                                   | 2011 - 2017 | 21                            | 1                 | Sites               | 4.76                 |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 0.000000102                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.76627     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 340.43      | degree C                |       |
| Boiling point                                                  | TEST QSAR  |             |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 0.0000812   | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.0000769   | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00011245  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.000074    | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 69.9796     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 94.189      | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000000144 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.71388     | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                                                                                                                                   |
| 363              | USEPA. 2016. Diazinon Draft Human Health Risk Assessment for Registration Review. EPA-HQ-OPP-2008-0351-0093. DP No. D419216. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                            |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**Dicamba**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Dicamba                       |
| CASRN:          | 1918-00-9                     |
| DTXSID:         | <a href="#">DTXSID4024018</a> |
| Use:            | Herbicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.032                      |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 5       | reproductive and developmental effects | 4          | 5         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect      | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 50                     | decreased pup weight | bottle-fed infants | OPP               | 2016                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 1.576                        | 90th Percentile                               | Finished Water                       | UCM2   | 1993-1997 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



## Dicamba

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect      | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|----------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.04  | mg/kg/day | OPP 2016          | Masters 1993   | decreased pup weight | bottle-fed infants | 151                         | 53.0       | [364]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2016          |                |                      |                    |                             |            | [364]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units | Source                             | Notes |
|---------------------------------------------|-------|-------|------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |                                    |       |
| Chronic Health-Based Guidance Value         | 0.2   | mg/L  | MN DOH                             |       |
| Lifetime Health Advisory                    | 4     | mg/L  | EPA DWSHA 2018                     |       |
| Maximum Allowable Concentration (MAC)       | 0.12  | mg/L  | Canadian Drinking Water Guidelines |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units     | Source                          | Notes |
|---------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                 |       |
| LD50                                        | 3000  | mg/kg     | NIH HSDB                        | max   |
| LD50                                        | 757   | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                       | 122   | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                       | 419   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                       | 160   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                       | 30    | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in                | 1.02  | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0046452 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.143     | no units | TEST QSAR |       |
| Developmental toxin test | 0.447     | no units | TEST QSAR |       |

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OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   | <b>Prevalence</b>  |                      |                         |                        | <b>Magnitude</b>          |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 | 14,034                        | 48                | Sites              | 0.34                 | 0.02                    | 0.2                    | 1.58                      | 4.06                    | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   | <b>Prevalence</b>  |                      |                         |                        | <b>Magnitude</b>          |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 7,759                         | 133               | Sites              | 1.71                 | 0.01                    | 0.15                   | 0.998                     | 9.97                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 1,208                         | 116               | Sites              | 9.6                  | 0.01                    | 0.15                   | 0.979                     | 9.97                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 6,551                         | 17                | Sites              | 0.26                 | 0.01                    | 0.14                   | 1.15                      | 4.03                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 48               | 9,773,162                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 12               | 103,082                    | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   | <b>Prevalence</b>   |                      |                         |                        | <b>Magnitude</b>          |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 185                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - MA (Finished)                                         | 2006 - 2020 | 819                           | 3                 | Sites               | 0.37                 | 0.1                     | 0.7                    | 0.7                       | 0.7                     | ug/L        |       |
| Drinking Water Monitoring Data - WA (Finished)                                         | 2006 - 2011 | 782                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Disinfection Byproducts ICR 1997-1998. (Finished)                                      | 1997 - 1998 | 291                           | 273               | Sites               | 94                   | 1                       | 11                     | 26                        | 114.4                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 12                            | 2                 | Sites               | 17                   | 0.025                   | 0.068                  | 0.0888                    | 0.094                   | ug/L        |       |
| Community Water System Survey (CWSS) (Finished) [178]                                  | 2006        | 3                             | NA                | Sites               |                      |                         | 50                     | 50                        |                         | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   | <b>Prevalence</b>   |                      |                         |                        | <b>Magnitude</b>          |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 1,936                         | 5                 | Sites               | 0.26                 | 0.21                    | 2.7                    | 2.92                      | 3                       | ug/L        |       |
| Drinking Water Monitoring Data - MA (Source)                                           | 2006 - 2020 | 77                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - PA (Source)                                           | 2006 - 2011 | 2                             | 1                 | Sites               | 50                   | 0.44                    | 0.44                   | 0.44                      | 0.44                    | ug/L        |       |
| Drinking Water Monitoring Data - WA (Source)                                           | 2006 - 2011 | 968                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WI (Source)                                           | 2012-2019   | 117                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 480                           | 26                | Sites               | 5.42                 | 0.01                    | 0.165                  | 1.24                      | 16.6                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 1,059                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 1,539                         | 26                | Sites               | 1.69                 | 0.01                    | 0.165                  | 1.24                      | 16.6                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 6                 | Sites               | 2.62                 | 0.0165                  | 0.0705                 | 0.112                     | 0.112                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 218                           | 3                 | Sites               | 1.38                 | 0.0165                  | 0.0165                 | 0.0925                    | 0.111555                | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 3                 | Sites               | 25                   | 0.025                   | 0.091                  | 0.111                     | 0.112                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 1,058                         | 286               | Sites               | 27                   | 0.05                    | 0.117                  | 0.517                     | 14                      | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 1                 | Sites               | 2.63                 | 0.1453                  | 0.145                  | 0.145                     | 0.1453                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 1                 | Sites               | 0.14                 | 0.474                   | 0.474                  | 0.474                     | 0.474                   | ug/L        |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                                     | 2002 - 2010 | 126                           | 1                 | Samples             | 0.8                  |                         |                        |                           | 0.58                    | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   | <b>Prevalence</b>   |                      |                         |                        | <b>Magnitude</b>          |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         |                         |                        |                           | <b>Notes</b>            |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 1.26E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|----------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.51412    | days                    |       |
| Boiling point                                                  | OPERA QSAR | 301.323    | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 314.148    | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.0000115  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.0000306  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0145152  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00726106 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 3.37811    | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 4.12098    | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 9.42E-10   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.25754    | no units                |       |

**Dicamba**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                                                                                                                                                              |
| 364              | USEPA. 2016. Dicamba and Dicamba BAPMA Salt: Human-Health Risk Assessment for Proposed Section 3 New Uses on Dicamba-tolerant Cotton and Soybean. EPA-HQ-OPP-2012-0841-0052. DP Nos. D378366 D404917 D402514 D421306. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                   |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**Dichlorvos (DDVP)**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                  |
|-----------------|----------------------------------|
| Name:           | Dichlorvos (DDVP)                |
| CASRN:          | 62-73-7                          |
| DTXSID:         | <a href="#">DTXSID5020449</a>    |
| Use:            | Insecticide; veterinary medicine |
| Chemical Notes: |                                  |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxics                                 | X |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.03                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 7       | non-cancer effects | 7          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                     | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 3                      | red blood cell and plasma cholinesterase inhibition | general population | OPP               | 2006                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.09118                      | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Dichlorvos (DDVP)

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study   | Critical Effect                                     | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|------------------|-----------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0005 | mg/kg/day | OPP 2006          | Markiewicz, 1990 | plasma and red blood cell cholinesterase inhibition | general population | 33.8                        | 2.96       | [265]                    |       |
| Cancer Classification (CC)         | S      |           | OPP 2006          |                  |                                                     |                    |                             |            | [265]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                     | Value          | Units                     | Source                                  | Notes |
|--------------------------------------------------|----------------|---------------------------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |                |                           |                                         |       |
| Acute Human Health Benchmark                     | 0.05           | mg/L                      | EPA HHBP                                |       |
| Acute Inhalation Minimal Risk Level (MRL)        | 0.002          | ppm                       | CDC ATSDR                               |       |
| Acute Minimal Risk Level (MRL)                   | 0.004          | mg/kg/day                 | CDC ATSDR                               |       |
| Acute PAD                                        | 0.008          | mg/kg/day                 | EPA HHBP                                |       |
| Cancer Slope Factor (CSF)                        | 0.29           | (mg/kg/day) <sup>-1</sup> | CalEPA OEHHA Chemical Database          |       |
| Chronic Human Health Benchmark                   | 0.003          | mg/L                      | EPA HHBP                                |       |
| Chronic inhalation Minimal Risk Level (MRL)      | 0.00006        | ppm                       | CDC ATSDR                               |       |
| Health-Based Screening Level                     | 0.003          | mg/L                      | Health-based screening levels from USGS |       |
| Inhalation Unit Risk (IUR)                       | 0.000083       | ug/m <sup>3</sup>         | CalEPA OEHHA Chemical Database          |       |
| Intermediate Inhalation Minimal Risk Level (MRL) | 0.0003         | ppm                       | CDC ATSDR                               |       |
| Intermediate Minimal Risk Level (MRL)            | 0.003          | mg/kg/day                 | CDC ATSDR                               |       |
| Population-Adjusted Dose (PAD)                   | 0.0005         | mg/kg/day                 | EPA HHBP                                |       |
| Reference Concentration (RFC)                    | 0.0005         | mg/m <sup>3</sup>         | EPA IRIS                                |       |
| Cancer Classification (CC)                       | 2B             | no units                  | WHO IARC                                |       |
| Cancer Classification (CC)                       | Female.Mice N  | no units                  | HHS NTP                                 |       |
| Cancer Classification (CC)                       | Female.Mice P  | no units                  | HHS NTP                                 |       |
| Cancer Classification (CC)                       | Female.Rats EE | no units                  | HHS NTP                                 |       |
| Cancer Classification (CC)                       | Female.Rats N  | no units                  | HHS NTP                                 |       |
| Cancer Classification (CC)                       | Male.Mice N    | no units                  | HHS NTP                                 |       |
| Cancer Classification (CC)                       | Male.Mice SE   | no units                  | HHS NTP                                 |       |
| Cancer Classification (CC)                       | Male.Rats N    | no units                  | HHS NTP                                 |       |
| Cancer Classification (CC)                       | Male.Rats SE   | no units                  | HHS NTP                                 |       |

| Data Element                                     | Value   | Units     | Source                          | Notes |
|--------------------------------------------------|---------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |         |           |                                 |       |
| Inhalation LOAEL                                 | 0.05532 | mg/L      | EPA Toxicity Reference Database |       |
| Inhalation NOAEL                                 | 0.00553 | mg/L      | EPA Toxicity Reference Database |       |
| LD50                                             | 140     | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 6.51    | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 1       | mg/kg/day | EPA Toxicity Reference Database |       |
| NOAEL                                            | 0.05    | mg/kg/day | EPA Toxicity Reference Database |       |
| Percent of active toxcast in vitro assays tested | 7.13    | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 1.5     | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 0.1     | mg/kg/day | EPA Toxicity Reference Database |       |
| TD50                                             | 3.21    | mg/kg/day | NIH CPDB                        | min   |
| TD50                                             | 7850    | mg/kg/day | NIH CPDB                        | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0000565 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.617     | no units | TEST QSAR |       |
| Developmental toxin test | 0.71      | no units | TEST QSAR |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Scoring Data                                                   |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      |                         | Magnitude              |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      |                         | Magnitude              |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 4,978                         | 60                | Sites              | 1.21                 | 0.0012                  | 0.01                   | 0.0912                    | 0.402                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 615                           | 58                | Sites              | 9.43                 | 0.0012                  | 0.01                   | 0.0896                    | 0.402                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 4,363                         | 2                 | Sites              | 0.05                 | 0.0103                  | 0.111                  | 0.172                     | 0.212                   | ug/L        |       |

| Non-Scoring Data                                                                       |      |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|----------------------------------------------------------------------------------------|------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Non-Nationally Representative Water Data                                               |      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| Finished Water                                                                         |      |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         |      | 2006 - 2020 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           |      | 2001 - 2013 | 15                            | 1                 | Sites               | 6.67                 | 0.027                   | 0.027                  | 0.027                     | 0.027                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          |      | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Ambient Water                                                                          |      |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           |      | 2006 - 2020 | 30                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          |      | 2008 - 2017 | 1,094                         | 52                | Sites               | 4.75                 | 0.0062                  | 0.0559                 | 0.258                     | 2.24                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            |      | 2008 - 2017 | 2,766                         | 1                 | Sites               | 0.04                 | 0.0778                  | 0.0778                 | 0.0778                    | 0.0778                  | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              |      | 2008 - 2017 | 3,859                         | 53                | Sites               | 1.37                 | 0.0062                  | 0.058                  | 0.257                     | 2.24                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 |      | 2001 - 2013 | 120                           | 1                 | Sites               | 0.83                 | 0.027                   | 0.0432                 | 0.0562                    | 0.0595                  | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        |      | 2001 - 2013 | 113                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          |      | 2001 - 2013 | 8                             | 1                 | Sites               | 12                   | 0.027                   | 0.0432                 | 0.0562                    | 0.0595                  | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] |      | 1990 - 2018 | 9,029                         | 20                | Sites               | 0.22                 | 0.007                   | 0.109                  | 0.531                     | 0.634                   | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      |      | 2012 - 2013 | 690                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           |      | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Waste Water Effluent                                                                   |      |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
|                                                                                        |      |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date | Source      | Value                         | Units             | Model               | Notes                |                         |                        |                           |                         |             |       |
|                                                                                        |      |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value     | Units                   | Notes |
|-------------------------------------------------------------------|------------|-----------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 4.13846   | days                    |       |
| Boiling point                                                     | OPERA QSAR | 226.392   | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 215.618   | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.0189601 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.047863  | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0349528 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.159221  | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 0.579336  | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 3.75837   | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 3.85E-09  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 1.38464   | no units                |       |

**Dichlorvos (DDVP)**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 265              | USEPA. 2006. Dichlorvos (DDVP) HED Chapter of the Reregistration Eligibility Decision Document (RED). EPA-HQ-OPP-2002-0302-0016. DP No. D330262. U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Washington, D.C.                                                                                                                                                                     |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                    |

**Dicrotophos**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Dicrotophos                   |
| CASRN:          | 141-66-2                      |
| DTXSID:         | <a href="#">DTXSID9023914</a> |
| Use:            | Insecticide                   |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| List                     | 4.0                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 8       | reproductive and developmental effects | 6          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                    | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.04                   | inhibition of brain cholinesterase | bottle-fed infants | OPP               | 2015                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.158                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



## Dicrotophos

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value   | Units     | Assessment Source | Critical Study          | Critical Effect                                 | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|---------|-----------|-------------------|-------------------------|-------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.00003 | mg/kg/day | OPP 2015          | Allen 1998; Horner 1995 | inhibition of brain cholinesterase in adult rat | bottle-fed infants | 151                         | 0.0397     | [341]                    |       |
| Cancer Classification (CC)         | 5       |           | OPP 2015          |                         |                                                 |                    |                             |            | [341]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value   | Units     | Source                                  | Notes |
|---------------------------------------------|---------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |         |           |                                         |       |
| Acute Human Health Benchmark                | 0.0005  | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.00007 | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.0002  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.0002  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.00003 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 21    | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 9     | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 0.02  | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 1.58  | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 0.5   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 0.025 | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 1.14  | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value   | Units    | Source    | Notes |
|--------------------------|---------|----------|-----------|-------|
| <b>Modeled Data</b>      |         |          |           |       |
| LD50                     | 0.00003 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.421   | no units | TEST QSAR |       |
| Developmental toxin test | 0.694   | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

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EPA - Office of Water

Dicrotophos  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 4,916                         | 33                | Sites               | 0.67                 | 5.00E - 04              | 0.0102                 | 0.158                     | 6.83                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 581                           | 29                | Sites               | 4.99                 | 5.00E - 04              | 0.01                   | 0.152                     | 6.83                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 4,335                         | 4                 | Sites               | 0.09                 | 0.00289                 | 0.03                   | 0.156                     | 0.233                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 15               | 1,067,130                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 2                 | Sites               | 12                   | 0.0015                  | 0.0015                 | 0.00283                   | 0.0034                  | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 145                           | 2                 | Sites               | 1.38                 | 0.0015                  | 0.0015                 | 0.0015                    | 0.0015                  | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 135                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 2                 | Sites               | 17                   | 0.0015                  | 0.0015                 | 0.0015                    | 0.0015                  | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 3                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                   |      | 0.00000999                              |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 4.1385      | days                    |       |
| Boiling point                                                     | OPERA QSAR | 309.886     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 299.282     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.000160652 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.000208449 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 3.40278     | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0542001   | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 0.922274    | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 1.64437     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 6.11E-11    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | -0.0116744  | no units                |       |

**Dicrotophos**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 341              | USEPA. 2015. Dicrotophos: Revised Human Health Risk Assessment for Registration Review of Dicrotophos. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                                                  |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                    |

## Dieldrin

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                                      |
|-----------------|------------------------------------------------------|
| Name:           | Dieldrin                                             |
| CASRN:          | 60-57-1                                              |
| DTXSID:         | <a href="#">DTXSID9020453</a>                        |
| Use:            | Restricted insecticide                               |
| Chemical Notes: | Canceled pesticide. Last end of use date: 5/15/1987. |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxics                                 | X |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 | X |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 380                        |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 7       | carcinogen with linear MOA | 1          | 5         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect  | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.002                  | liver carcinomas | general population | OW                | 2003                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date        |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-------------|
| 0.764                        | 90th Percentile                               | Finished Water                       | UCM2   | 1993 - 1997 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1  | RD 2           | RD 3           |
|-------|----------------|----------------|
| X     | Not Applicable | Not Applicable |
| Basis |                |                |

Dieldrin may cause adverse health effects in humans, specifically neurotoxicity to the central nervous system [a,b,c]. However, its occurrence in drinking water at frequencies or concentrations significant for public health concern is low; occurrence estimates from a cross-section of States with UCM data are very low with only 0.06% of all samples and 0.1% of PWSs showing detections where the HRL is 0.002 ug/L [d,e]. Furthermore, occurrence of dieldrin in drinking water supplies in the is likely to decrease in the coming years, since the chemical is no longer produced or used commercially [f].

[a] Jager, 1970 [113]; [b] ACGIH, 1984 [6]; [c] ATSDR, 2000 [16]; [d] USEPA, 2001 [239]; [e] USEPA, 2001 [247]; [f] ATSDR, 1993 [2]; as cited in USEPA, 2001 [179]

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

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Dieldrin  
CCL 5 Contaminant Information Sheet

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HEALTH EFFECTS DATA

Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                                                                         | Value   | Units                     | Assessment Source | Critical Study                                                                                                                                   | Critical Effect                                                           | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------|---------|---------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent                                                   | 0.00005 | mg/kg/day                 | IRIS 1988         | Walker et al., 1969                                                                                                                              | liver lesions                                                             | general population | 33.8                        | 0.296      | [198]                    |                                                                                                                                                                                                                                              |
| Reference Dose (RfD) or Equivalent                                                   | 0.00005 | mg/kg/day                 | ATSDR 2002        | Walker et al., 1969                                                                                                                              | increased liver weight, liver parenchymal cell changes, focal hyperplasia | general population | 33.8                        | 0.296      | [18]                     |                                                                                                                                                                                                                                              |
| Reference Dose (RfD) or Equivalent                                                   | 0.00005 | mg/kg/day                 | OW 2003           | Walker et al., 1969                                                                                                                              | increased liver weight, liver parenchymal cell changes, focal hyperplasia | general population | 33.8                        | 0.296      | [255]                    | NOTE: canceled registration, OPP does not provide a publicly-available health assessment for dieldrin; no new information has been published by EPA regarding health effects of dieldrin - refer to the 2003 RegDet supporting documentation |
| Cancer Slope Factor (CSF)                                                            | 16      | (mg/kg/day) <sup>-1</sup> | IRIS 1988         | (Davis and Fitzhugh, 1962; Davis, 1965; Walker et al., 1972; Thorpe and Walker, 1973; NCI, 1978; Tennekkes et al., 1981; Meierhenry et al., 1983 | liver carcinoma                                                           | general population | 33.8                        | 0.00185    | [198]                    |                                                                                                                                                                                                                                              |
| Cancer Slope Factor (CSF)                                                            | 16      | (mg/kg/day) <sup>-1</sup> | OW 2003           | Davis and Fitzhugh, 1962; Davis, 1965; Walker et al., 1972; Thorpe and Walker, 1973; NCI, 1978; Tennekkes et al., 1981; Meierhenry et al., 1983  | liver carcinoma                                                           | general population | 33.8                        | 0.00185    | [255]                    | NOTE: canceled registration, OPP does not provide a publicly-available health assessment for dieldrin; no new information has been published by EPA regarding health effects of dieldrin - refer to the 2003 RegDet supporting documentation |
| Cancer Classification (CC)                                                           | B2      |                           | IRIS 1988         |                                                                                                                                                  |                                                                           |                    |                             |            | [198]                    |                                                                                                                                                                                                                                              |
| Cancer Classification (CC)                                                           | B2      |                           | OW 2003           |                                                                                                                                                  |                                                                           |                    |                             |            | [255]                    | NOTE: canceled registration, OPP does not provide a publicly-available health assessment for dieldrin; no new information has been published by EPA regarding health effects of dieldrin - refer to the 2003 RegDet supporting documentation |
| Non-qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations |         |                           |                   |                                                                                                                                                  |                                                                           |                    |                             |            |                          |                                                                                                                                                                                                                                              |
| OPP                                                                                  |         |                           |                   |                                                                                                                                                  |                                                                           |                    |                             |            |                          |                                                                                                                                                                                                                                              |

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References Identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

Other Health Data

| Data Element                                      | Value          | Units                              | Source                                | Notes |
|---------------------------------------------------|----------------|------------------------------------|---------------------------------------|-------|
| Measured Data and Assessment Results              |                |                                    |                                       |       |
| 10-day Health Advisory                            | 0.0005         | mg/L                               | EPA DWSHA 2018                        |       |
| Acute Health-Based Guidance Value                 | 0.0002         | mg/L                               | MN DOH                                |       |
| Acute Health-Based Guidance Value                 | 0.0002         | mg/L                               | MN DOH                                |       |
| Acute Health-Based Guidance Value                 | 0.0002         | mg/L                               | MN DOH                                |       |
| Cancer Slope Factor (CSF)                         | 16             | (mg/kg/day) <sup>-1</sup>          | CalEPA OEHH Chemical Database         |       |
| Chronic Health-Based Guidance Value               | 0.0002         | mg/L                               | MN DOH                                |       |
| Chronic Health-Based Guidance Value               | 0.0002         | mg/L                               | MN DOH                                |       |
| Chronic Health-Based Guidance Value               | 0.0000006      | mg/L                               | MN DOH                                |       |
| Chronic Health-Based Guidance Value               | 0.0000006      | mg/L                               | MN DOH                                |       |
| Drinking Water Guideline Value                    | 0.00003        | mg/L                               | WHO Drinking Water Quality Guidelines |       |
| Human Health Ambient Water Quality Criteria       | 1.2E-09        | mg/L                               | EPA Human Health Criteria for CWA     |       |
| Inhalation Unit Risk (IUR)                        | 0.0046         | (ug/m <sup>3</sup> ) <sup>-1</sup> | EPA IRIS                              |       |
| Inhalation Unit Risk (IUR)                        | 0.0046         | ug/m <sup>3</sup>                  | CalEPA OEHH Chemical Database         |       |
| Intermediate Minimal Risk Level (MRL)             | 0.0001         | mg/kg/day                          | CDC ATSDR                             |       |
| Lifetime Health Advisory                          | 0.000002       | mg/L                               | EPA DWSHA 2018                        |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.0002         | mg/L                               | MN DOH                                |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.0002         | mg/L                               | MN DOH                                |       |
| Cancer Classification (CC)                        | Female.Mice N  | no units                           | HHS NTP                               |       |
| Cancer Classification (CC)                        | Female.Mice NT | no units                           | HHS NTP                               |       |
| Cancer Classification (CC)                        | Female.Rats N  | no units                           | HHS NTP                               |       |
| Cancer Classification (CC)                        | Female.Rats N  | no units                           | HHS NTP                               |       |
| Cancer Classification (CC)                        | Male.Mice F    | no units                           | HHS NTP                               |       |
| Cancer Classification (CC)                        | Male.Mice NT   | no units                           | HHS NTP                               |       |
| Cancer Classification (CC)                        | Male.Rats N    | no units                           | HHS NTP                               |       |
| Cancer Classification (CC)                        | Male.Rats N    | no units                           | HHS NTP                               |       |

| Data Element                                      | Value | Units     | Source                  | Notes |
|---------------------------------------------------|-------|-----------|-------------------------|-------|
| Measured Data and Assessment Results              |       |           |                         |       |
| LD50                                              | 3     | mg/kg     | NIH HSDB                | min   |
| LD50                                              | 37000 | mg/kg     | NIH HSDB                | max   |
| Percent of active toxicant in vitro assays tested | 21.43 | percent   | EPA Chemistry Dashboard |       |
| TD50                                              | 1.04  | mg/kg/day | NIH CPDB                | min   |
| TD50                                              | 489   | mg/kg/day | NIH CPDB                | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| Modeled Data             |           |          |           |       |
| LD50                     | 0.0000284 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.019     | no units | TEST QSAR |       |
| Developmental toxin test | 0.55      | no units | TEST QSAR |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
The full citation for the critical study is provided in the corresponding health assessment.  
PECO = Population, Exposure, Comparator, Outcome.

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Dieldrin  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

July 2021

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 | 11,788                        | 11                | Sites              | 0.09                 | 0.02                    | 0.15                   | 0.764                     | 1.36                    | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 10,180                        | 351               | Sites              | 3.45                 | 0.001                   | 0.009                  | 0.05                      | 5.6                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,054                         | 154               | Sites              | 7.5                  | 0.001                   | 0.007                  | 0.02                      | 0.19                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 8,127                         | 197               | Sites              | 2.42                 | 0.001                   | 0.013                  | 0.19                      | 5.6                     | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 162                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - MA (Finished)                                         | 2006 - 2020 | 822                           | 2                 | Sites               | 0.24                 | 0.037                   | 0.0385                 | 0.0397                    | 0.04                    | ug/L        |       |
| Drinking Water Monitoring Data - WA (Finished)                                         | 2006 - 2011 | 825                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 13                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Hawaii Department of Health (Finished) [172]                                           | 2014        | 1                             | NA                | Sites               |                      | 0.01                    | 0.01                   | 0.01                      | 0.01                    | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 1,514                         | 4                 | Sites               | 0.26                 | 0.01                    | 0.025                  | 31.2                      | 52                      | ug/L        |       |
| Drinking Water Monitoring Data - FL (Source)                                           | 2006 - 2011 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - MA (Source)                                           | 2006 - 2020 | 77                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - PA (Source)                                           | 2006 - 2011 | 3                             | 1                 | Sites               | 33                   | 0.044                   | 0.044                  | 0.044                     | 0.044                   | ug/L        |       |
| Drinking Water Monitoring Data - WA (Source)                                           | 2006 - 2011 | 999                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WI (Source)                                           | 2012-2019   | 92                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 747                           | 42                | Sites               | 5.62                 | 5.00E - 04              | 0.003                  | 0.0166                    | 0.13                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 2,630                         | 69                | Sites               | 2.62                 | 0.001                   | 0.0158                 | 0.074                     | 1.78                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 3,376                         | 111               | Sites               | 3.29                 | 5.00E - 04              | 0.008                  | 0.0686                    | 1.78                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 8                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 6                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 604                           | 45                | Sites               | 7.45                 | 0.003                   | 0.011                  | 0.197                     | 0.38                    | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 28                | Sites               | 74                   | 6.78E-05                | 0.000774               | 0.00245                   | 0.0128                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 106                           | 2                 | Sites               | 1.89                 | 0.002                   | 0.003                  | 0.0038                    | 0.004                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Minnesota Department of Health (Ambient) [149]                                         | 1970 - 2016 | NA                            | 32                | Samples             |                      | 0.01                    |                        |                           | 0.9                     | ug/L        |       |
| Village Creek, AL (Ambient) [75]                                                       | 2015        | 4                             | NA                | Sites               |                      | 0.00096                 | 0.0013                 | 0.00142                   | 0.0015                  | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                |                         |                        |                           |                         | Notes       |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                   |      | 0.00000129                              |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) | 14.4                         | ng/g  |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|-------------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 343.763    | days                    |       |
| Boiling point                                                     | OPERA QSAR | 329.92     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 384.804    | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.00000411 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.00000224 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.00000419 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0000026  | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 6042.55    | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 918.333    | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.000013   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 5.43154    | no units                |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

**Dieldrin**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2                | Agency for Toxic Substances and Disease Registry (ATSDR). 1993. Toxicological Profile for Aldrin/Dieldrin (update). Atlanta: Agency for Toxic Substances and Disease Registry. 184 pp.                                                                                                                                                                                                                                             |
| 6                | American Conference of Governmental Industrial Hygienists (ACGIH). 1984. Documentation of the Threshold Limit Values for Substances in Workroom Air. Third Edition. Cincinnati, OH: ACGIH. 139 pp.                                                                                                                                                                                                                                 |
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 16               | ATSDR. 2000. Toxicological Profile for Aldrin/Dieldrin (Update). Atlanta, GA: Agency for Toxic Substances and Disease Registry. 280 pp.                                                                                                                                                                                                                                                                                            |
| 18               | ATSDR. 2002. Toxicological Profile for Aldrin/Dieldrin. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                                                                                                                                                                |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. Environmental science & technology, 51(9), 4792-4802.                                                                                                                                               |
| 75               | EPA Region 4. Village Creek Dieldrin Screening. June 2015. <a href="https://www.birminghamal.gov/wp-content/uploads/2017/08/15-0308-Village-Creek-Dieldrin-Screening-Final-Report-v081015.pdf">https://www.birminghamal.gov/wp-content/uploads/2017/08/15-0308-Village-Creek-Dieldrin-Screening-Final-Report-v081015.pdf</a>                                                                                                       |
| 113              | Jager, K.W. 1970. Aldrin, Dieldrin, Endrin and Telodrin: An Epidemiological and Toxicological Study of Long-Term Occupational Exposure. New York: Elsevier Publishing Company. 234 pp.                                                                                                                                                                                                                                             |
| 149              | Minnesota Department of Health. Dieldrin and Drinking Water. October 2016. <a href="https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/dieldrininfo.pdf">https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/dieldrininfo.pdf</a>                                                                                                                                               |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 172              | State of Hawaii Department of Health. Trace levels of dieldrin and bromacil in two Oahu Water Systems. January 2015. <a href="https://health.hawaii.gov/news/files/2013/05/TRACE-LEVELS-OF-DIELDRIN-AND-BROMACIL-DETECTED-IN-TWO-OAHU-WATER-SYSTEMS.pdf">https://health.hawaii.gov/news/files/2013/05/TRACE-LEVELS-OF-DIELDRIN-AND-BROMACIL-DETECTED-IN-TWO-OAHU-WATER-SYSTEMS.pdf</a>                                             |
| 179              | USEPA, 2001. Regulatory Determination Support Document for Aldrin and Dieldrin. EPA 815 R-01-011.                                                                                                                                                                                                                                                                                                                                  |
| 198              | USEPA. 1988. Chemical Assessment Summary, Dieldrin. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, DC.                                                                                                                                                                                                                                 |
| 239              | USEPA. 2001. Analysis of National Occurrence of the 1998 Contaminant Candidate List Regulatory Determination Priority Contaminants in Public Water Systems. Office of Water. EPA report 815-D-01-002. 77 pp.                                                                                                                                                                                                                       |
| 247              | USEPA. 2001. Occurrence of Unregulated Contaminants in Public Water Systems: An Initial Assessment. Office of Water. EPA report 815-P-00-001. Office of Water. 50 pp.                                                                                                                                                                                                                                                              |
| 255              | USEPA. 2003. Contaminant Candidate List Regulatory Determination Support Document for Aldrin and Dieldrin. U.S. Environmental Protection Agency, Office of Water, Standards and Risk Management Division, Washington, D.C.                                                                                                                                                                                                         |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society                                                                                                     |

**Diethyl phthalate**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

**CONTAMINANT IDENTIFYING INFORMATION**

|                        |                                                                                                                                                                                            |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Name:</b>           | Diethyl phthalate                                                                                                                                                                          |
| <b>CASRN:</b>          | 84-66-2                                                                                                                                                                                    |
| <b>DTXSID:</b>         | <a href="#">DTXSID7021780</a>                                                                                                                                                              |
| <b>Use:</b>            | Solvent for nitrocellulose and cellulose acetate, plasticizer, wetting agent; in plastics, perfumery as fixative and solvent, alcohol denaturant, plasticizer in solid rocket propellants. |
| <b>Chemical Notes:</b> |                                                                                                                                                                                            |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                                 |                                   |
|---------------------------------|-----------------------------------|
| <b>Draft CCL5 List Decision</b> | <b>Final Hazard Quotient (HQ)</b> |
| Not List                        | 0.00016                           |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 3       | non-cancer effects | 9          | 5         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                         | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 4000                   | decreased weight gain and kidney weight | general population | OW                | 1992                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.62                         | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                          |
|--------------------------|
| <b>Public Nomination</b> |
|                          |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



## Diethyl phthalate

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study    | Critical Effect                                                      | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|-------------------|----------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.8   | mg/kg/day | IRIS 1987         | Brown et al. 1978 | decreased growth rate and food consumption and altered organ weights | general population | 33.8                        | 4730       | [192]                    |       |
| Reference Dose (RfD) or Equivalent | 0.75  | mg/kg/day | OW 1992           | Brown et al. 1978 | decreased weight gain and kidney weight                              | general population | 33.8                        | 4440       | [218]                    |       |
| Cancer Classification (CC)         | D     |           | IRIS 1987         |                   |                                                                      |                    |                             |            | [192]                    |       |
| Cancer Classification (CC)         | D     |           | OW 1992           |                   |                                                                      |                    |                             |            | [218]                    |       |
|                                    |       |           | ATSDR 1995        |                   |                                                                      |                    |                             |            | [9]                      |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects     | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study           | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|---------------------------------|-----------------------------|------------------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Systemic, Reproductive, Hepatic | 0.57                        | Pereira, 2008, Pereira, 2006 | Reproductive                 | 1470                         | Yamasaki, 2005      | 1994-06-01           | 2020-04-14         | 728                                            | 10                                              | 39                                             | 7                                                 |

## Other Health Data

| Data Element                                | Value          | Units     | Source                            | Notes |
|---------------------------------------------|----------------|-----------|-----------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |                |           |                                   |       |
| Chronic Health-Based Guidance Value         | 6              | mg/L      | MN DOH                            |       |
| Human Health Ambient Water Quality Criteria | 0.6            | mg/L      | EPA Human Health Criteria for CWA |       |
| Intermediate Minimal Risk Level (MRL)       | 6              | mg/kg/day | CDC ATSDR                         |       |
| Cancer Classification (CC)                  | Female.Mice EE | no units  | HHS NTP                           |       |
| Cancer Classification (CC)                  | Female.Rats NE | no units  | HHS NTP                           |       |
| Cancer Classification (CC)                  | Male.Mice EE   | no units  | HHS NTP                           |       |
| Cancer Classification (CC)                  | Male.Rats NE   | no units  | HHS NTP                           |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 1000  | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 9200  | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 1150  | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 197   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 267   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 56    | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 1.44  | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0157036 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.16      | no units | TEST QSAR |       |
| Developmental toxin test | 0.748     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Diethyl phthalate  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 46                            | 3                 | Sites               | 6.52                 | 0.1                     | 0.2                    | 0.62                      | 0.8                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 37                            | 3                 | Sites               | 8.11                 | 0.1                     | 0.2                    | 0.62                      | 0.8                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) | 1M - 10M                     |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 17                            | 1                 | Sites               | 5.88                 | 0.007                   | 0.0435                 | 5.5                       | 6.2                     | ug/L        |       |
| Drinking Water Monitoring Data - WA (Finished)                | 2006 - 2011 | 483                           | 1                 | Sites               | 0.21                 | 4.9                     | 4.9                    | 4.9                       | 4.9                     | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                             | 1                 | Sites               | 100                  | 0.1                     | 0.1                    | 0.1                       | 0.1                     | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 113                           | 2                 | Sites               | 1.77                 | 0.005                   | 0.046                  | 6.34                      | 13.6                    | ug/L        |       |
| Drinking Water Monitoring Data - WA (Source)                  | 2006 - 2011 | 638                           | 2                 | Sites               | 0.31                 | 0.421                   | 0.76                   | 1.03                      | 1.1                     | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 631                           | 137               | Sites               | 22                   | 0.09                    | 0.2                    | 0.588                     | 5                       | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 605                           | 52                | Sites               | 8.6                  | 0.06                    | 0.2                    | 1.3                       | 60.4                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,236                         | 189               | Sites               | 15                   | 0.06                    | 0.2                    | 0.6                       | 60.4                    | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                            | 2                 | Sites               | 5.26                 | 0.128                   | 0.135                  | 0.141                     | 0.142                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                             | 1                 | Sites               | 50                   | 0.1                     | 0.1                    | 0.1                       | 0.1                     | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                              | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                   |      | 0.0000694                               |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|-------------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 4.31107    | days                    |       |
| Boiling point                                                     | OPERA QSAR | 297.011    | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 312.231    | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.00203233 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.00091622 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.00366221 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.00165196 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 7.15782    | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 6.45654    | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 2.38E-08   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 2.36526    | no units                |       |

**Diethyl phthalate**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                   |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9                | ATSDR. 1995. Toxicological Profile for Diethyl Phthalate. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                            |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802. |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                               |
| 192              | USEPA. 1987. Chemical Assessment Summary, Diethyl Phthalate. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, DC.                                                                                      |
| 218              | USEPA. 1992. Drinking Water Criteria Document for Phthalic Acid Esters (PAEs). U.S. Environmental Protection Agency, Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH.                                                                |

**Difenoconazole**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                    |
|-----------------|----------------------------------------------------|
| Name:           | Difenoconazole                                     |
| CASRN:          | 119446-68-3                                        |
| DTXSID:         | <a href="#">DTXSID4032372</a>                      |
| Use:            | Fungicide, insecticide, seed treatment/protectant. |
| Chemical Notes: |                                                    |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.00030                    |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 7       | non-cancer effects | 9          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                           | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 60                     | cumulative decreases in body weight gains | general population | OPP               | 2017                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0182                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Difenoconazole

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                           | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|-------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.01  | mg/kg/day | OPP 2017          | Cox 1989       | cumulative decreases in body weight gains | general population | 33.8                        | 59.2       | [381]                    |       |
| Cancer Classification (CC)         | S     |           | OPP 2017          |                |                                           |                    |                             |            | [381]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source   | Notes |
|---------------------------------------------|-------|-----------|----------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |          |       |
| Acute Human Health Benchmark                | 1.7   | mg/L      | EPA HHBP |       |
| Acute PAD                                   | 0.25  | mg/kg/day | EPA HHBP |       |
| Chronic Human Health Benchmark              | 0.06  | mg/L      | EPA HHBP |       |
| Population-Adjusted Dose (PAD)              | 0.01  | mg/kg/day | EPA HHBP |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value  | Units     | Source                          | Notes |
|--------------------------------------------------|--------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |        |           |                                 |       |
| LD50                                             | 1453   | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 2150   | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 12.5   | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 171.25 | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 1.25   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 84.525 | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 32.36  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 10     | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 75     | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 1      | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 25     | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0025468 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.467     | no units | TEST QSAR |       |
| Developmental toxin test | 0.413     | no units | TEST QSAR |       |

## Difenoconazole

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 14                                  | 1                    | Sites                 | 7.14                    | 0.0182                     | 0.0182                    | 0.0182                       | 0.0182                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 14                                  | 1                    | Sites                 | 7.14                    | 0.0182                     | 0.0182                    | 0.0182                       | 0.0182                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 47               | 400,757                      | 2016 | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 15                                  | 1                    | Sites                  | 6.67                    | 0.0053                     | 0.0053                    | 0.0053                       | 0.0053                     | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 132                                 | 4                    | Sites                  | 3.03                    | 0.0084                     | 0.0296                    | 0.168                        | 0.249                      | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 3                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 135                                 | 4                    | Sites                  | 2.96                    | 0.0084                     | 0.0296                    | 0.168                        | 0.249                      | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 227                                 | 1                    | Sites                  | 0.44                    | 0.0053                     | 0.0053                    | 0.0053                       | 0.0053                     | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 218                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 10                                  | 1                    | Sites                  | 10                      | 0.0053                     | 0.0053                    | 0.0053                       | 0.0053                     | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 123                                 | 1                    | Sites                  | 0.81                    | 0.0182                     | 0.0182                    | 0.0182                       | 0.0182                     | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                       | <b>Value</b>         | <b>Units</b>           | <b>Model</b>            | <b>Notes</b>               |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expcast exposure                                   |      | 0.000000137                                   |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|-------------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.36121    | days                    |       |
| Boiling point                                                     | OPERA QSAR | 335.605    | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 413.931    | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 6.17E-10   | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 1.75E-09   | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0000202  | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000014   | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 230.63     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 148.936    | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.00000505 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 4.07726    | no units                |       |

**Difenoconazole**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                  |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 381              | USEPA. 2017. Difenoconazole: human health risk assessment for proposed new foliar uses on cotton, rice and wild rice. EPA-HQ-OPP-2016-0254-0010. DP No. D432211. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                     |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society. |

**Dimethenamid**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                        |                               |
|------------------------|-------------------------------|
| <b>Name:</b>           | Dimethenamid                  |
| <b>CASRN:</b>          | 87674-68-8                    |
| <b>DTXSID:</b>         | <a href="#">DTXSID4032376</a> |
| <b>Use:</b>            | Herbicide                     |
| <b>Chemical Notes:</b> |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                                 |                                   |
|---------------------------------|-----------------------------------|
| <b>Draft CCL5 List Decision</b> | <b>Final Hazard Quotient (HQ)</b> |
| Not List                        | 0.00034                           |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 9          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                             | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 300                    | decreased body weight gain and decreased body weight, increased microscopic hepatic lesions | general population | OPP               | 2014                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.103                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                          |
|--------------------------|
| <b>Public Nomination</b> |
|                          |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



## Dimethenamid

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study                                         | Critical Effect                                                                                                                          | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.05  | mg/kg/day | OPP 2014          | Ruckman et al. 1990; Sandoz Crop Protection Corp. 1990 | decreased body weight gain and decreased body weight, increased microscopic hepatic lesions, increased food conversion ratios in females | general population | 33.8                        | 296        | [332]                    |       |
| Cancer Classification (CC)         | C     |           | OPP 2014          |                                                        |                                                                                                                                          |                    |                             |            | [332]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                      | Value | Units     | Source                                  | Notes |
|---------------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |       |           |                                         |       |
| Acute Health-Based Guidance Value                 | 0.6   | mg/L      | MN DOH                                  |       |
| Acute Human Health Benchmark                      | 10    | mg/L      | EPA HHBP                                |       |
| Acute PAD                                         | 2     | mg/kg/day | EPA HHBP                                |       |
| Chronic Health-Based Guidance Value               | 0.3   | mg/L      | MN DOH                                  |       |
| Chronic Human Health Benchmark                    | 0.3   | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                      | 0.3   | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)                    | 0.05  | mg/kg/day | EPA HHBP                                |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.6   | mg/L      | MN DOH                                  |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 371       | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 427       | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 200       | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 36        | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 6.8       | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 75        | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 12.84     | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 33.599998 | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 98        | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 4.98      | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 40.1      | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value | Units    | Source    | Notes |
|--------------------------|-------|----------|-----------|-------|
| <b>Modeled Data</b>      |       |          |           |       |
| LD50                     |       |          | TEST QSAR |       |
| Ames mutagenicity test   | 0.443 | no units | TEST QSAR |       |
| Developmental toxin test | 0.711 | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
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EPA - Office of Water

Dimethenamid

CCL 5 Contaminant Information Sheet

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**OCCURRENCE DATA**

**Scoring Data**

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 2,362                         | 205               | Sites               | 8.68                 | 0.00012                 | 0.00812                | 0.103                     | 7                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 347                           | 194               | Sites               | 56                   | 0.00012                 | 0.00814                | 0.103                     | 7                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 2,015                         | 11                | Sites               | 0.55                 | 0.00031                 | 0.00161                | 0.021                     | 0.25                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 16               | 1,115,877                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

**Non-Scoring Data**

| Non-Nationally Representative Water Data                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                           | 2001 - 2013 | 12                            | 5                 | Sites               | 42                   | 0.000999                | 0.0024                 | 0.011                     | 0.075                   | ug/L        |       |
| <b>Ambient Water</b>                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)          | 2008 - 2017 | 358                           | 97                | Sites               | 27                   | 0.00018                 | 0.0175                 | 0.214                     | 3.19                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)            | 2008 - 2017 | 848                           | 10                | Sites               | 1.18                 | 0.0017                  | 0.07                   | 0.754                     | 0.842                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)              | 2008 - 2017 | 1,206                         | 107               | Sites               | 8.87                 | 0.00018                 | 0.0187                 | 0.237                     | 3.19                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated) | 2001 - 2013 | 229                           | 6                 | Sites               | 2.62                 | 0.000999                | 0.0042                 | 0.0299                    | 0.51                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                        | 2001 - 2013 | 219                           | 1                 | Sites               | 0.46                 | 0.004162                | 0.00416                | 0.00416                   | 0.004162                | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                          | 2001 - 2013 | 12                            | 5                 | Sites               | 42                   | 0.000999                | 0.0042                 | 0.03                      | 0.51                    | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                     | 2012 - 2014 | 38                            | 4                 | Sites               | 11                   | 0.03                    | 0.03                   | 0.079                     | 0.1                     | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                      | 2012 - 2013 | 584                           | 6                 | Sites               | 1.03                 | 3e-04                   | 0.0024                 | 0.0152                    | 0.0224                  | ug/L        |       |
| <b>Waste Water Effluent</b>                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                                  |      | 9.96E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.34757     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 294.303     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 337.241     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.000122276 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.0000108   | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.00253016  | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000765597 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 45.9219     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 17.8238     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 3.83E-08    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 2.13166     | no units                |       |

**Dimethenamid**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 332              | USEPA. 2014. Dimethenamid/Dimethenamid-P. Human Health Risk Assessment for Proposed New Use on Cotton Subgroup 20C. EPA-HQ-OPP-2013-0670-0005. DP No. D418118. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                          |

## Dimethenamid OA

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Dimethenamid OA               |
| CASRN:          | 380412-59-9                   |
| DTXSID:         | <a href="#">DTXSID4037530</a> |
| Use:            | Pesticide metabolite          |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxics                                 |  |
| PubMed Neurotoxics                                |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.00052                    |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 4       | non-cancer effects | 9          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                      | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 400                    | Decrease in body weight gain; liver effects (increased relative liver weight, bile duct hyperplasia) | general population | MDH               | 2013                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.209                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

## Basis

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Dimethenamid OA

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                                                                                      | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                                                                                                  |
|------------------------------------|-------|-----------|-------------------|----------------|------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.06  | mg/kg/day | MDH 2013          | Ruckman 1990   | Decrease in body weight gain; liver effects (increased relative liver weight; bile duct hyperplasia) | general population | 33.8                        | 355                        | [135]                    | NOTE: MN DOH determined that the RfD determined for dimethenamid would be protective for Dimethenamid OXA. MN DOH states that there are insufficient data to calculate a unique RfD for this compound. |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                      | Value | Units | Source | Notes |
|---------------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b>       |       |       |        |       |
| Acute Health-Based Guidance Value                 | 0.6   | mg/L  | MN DOH |       |
| Chronic Health-Based Guidance Value               | 0.3   | mg/L  | MN DOH |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.6   | mg/L  | MN DOH |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0005164 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | -0.084    | no units | TEST QSAR |       |
| Developmental toxin test | 0.898     | no units | TEST QSAR |       |

Dimethenamid OA  
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OCCURRENCE DATA

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## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 2,539                               | 73                   | Sites                 | 2.88                    | 0.0126                     | 0.0748                    | 0.209                        | 0.596                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 363                                 | 68                   | Sites                 | 19                      | 0.0126                     | 0.0747                    | 0.209                        | 0.596                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 2,176                               | 5                    | Sites                 | 0.23                    | 0.03                       | 0.0843                    | 0.183                        | 0.216                      | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                               | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|------------------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                                  |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                           | 2001 - 2013 | 12                                  | 5                    | Sites                  | 42                      | 0.00105                    | 0.0022                    | 0.0144                       | 0.03                       | ug/L        |       |
| <b>Ambient Water</b>                                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated) | 2001 - 2013 | 229                                 | 25                   | Sites                  | 11                      | 0.001049                   | 0.0045                    | 0.039                        | 0.061                      | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                        | 2001 - 2013 | 218                                 | 20                   | Sites                  | 9.17                    | 0.001049                   | 0.0078                    | 0.0311                       | 0.0441                     | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                          | 2001 - 2013 | 12                                  | 5                    | Sites                  | 42                      | 0.00105                    | 0.00425                   | 0.039                        | 0.061                      | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                     | 2012 - 2014 | 38                                  | 2                    | Sites                  | 5.26                    | 0.02                       | 0.02                      | 0.02                         | 0.02                       | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                      | 2012 - 2013 | 584                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                            |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water                                       | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expcast exposure                                   |      |                                               |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|-------------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.34519    | days                    |       |
| Boiling point                                                     | OPERA QSAR | 306.88     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 366.15     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.00000997 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.00000151 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0182443  | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0122462  | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 3.10149    | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 0.92045    | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 7.22E-10   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 1.82828    | no units                |       |

**Dimethenamid OA**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 135              | MDH. 2013. Dimethenamid Degradates: ESA and OXA. Health Based Guidance for Water. Minnesota Department of Health (MDH), Environmental Health Division, Health Risk Assessment Unit, St Paul, MN.                                                                                                                                                                                                                                   |

## Dimethoate

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Dimethoate                    |
| CASRN:          | 60-51-5                       |
| DTXSID:         | <a href="#">DTXSID7020479</a> |
| Use:            | Pesticide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxicants                              | X |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.16                       |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 7       | reproductive and developmental effects | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                          | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.3                    | inhibition of brain acetylcholinesterase | bottle-fed infants | OPP               | 2015                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.04707                      | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3 |
|----------------|----------------|------|
| Not Applicable | Not Applicable | X    |
| Basis          |                |      |

Dimethoate has the potential to cause adverse health effects, including cholinesterase inhibition. However, dimethoate does not appear to occur in PWSs with a frequency and at levels of public health concern [a,b]. Dimethoate was not detected in a number UCMR 2 samples collected by PWSs at levels greater than the ½ HRL (7.7 µg/L), the HRL (15.4 µg/L), or the MRL (0.7 µg/L)[c,d]. EPA concludes that regulation of dimethoate does not represent a meaningful opportunity for health risk reduction for persons served by PWSs due to the relatively small number of people likely exposed to dimethoate through drinking water [c,d].

[a] USEPA, 2007 [284]; [b] USEPA, 2007 [283]; [c] USEPA, 2010 [310]; [d] USEPA, 2015 [350]; as cited in USEPA, 2014 [334]

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



## Dimethoate

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value   | Units     | Assessment Source | Critical Study                                            | Critical Effect                          | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|---------|-----------|-------------------|-----------------------------------------------------------|------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.00022 | mg/kg/day | OPP 2015          | US EPA OP CRA 2002 & 2006; American Cyanamid Company 1986 | inhibition of brain acetylcholinesterase | bottle-fed infants | 151                         | 0.291      | [360]                    |       |
| Cancer Classification (CC)         | C       |           | OPP 2015          |                                                           |                                          |                    |                             |            | [360]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value         | Units     | Source                                  | Notes |
|---------------------------------------------|---------------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |               |           |                                         |       |
| Acute Human Health Benchmark                | 0.087         | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.013         | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.014         | mg/L      | EPA HHBP                                |       |
| Drinking Water Guideline Value              | 0.006         | mg/L      | WHO Drinking Water Quality Guidelines   |       |
| Health-Based Screening Level                | 0.014         | mg/L      | Health-based screening levels from USGS |       |
| Maximum Allowable Concentration (MAC)       | 0.02          | mg/L      | Canadian Drinking Water Guidelines      |       |
| Population-Adjusted Dose (PAD)              | 0.0022        | mg/kg/day | EPA HHBP                                |       |
| Cancer Classification (CC)                  | Female.Mice N | no units  | HHS NTP                                 |       |
| Cancer Classification (CC)                  | Female.Rats N | no units  | HHS NTP                                 |       |
| Cancer Classification (CC)                  | Male.Mice N   | no units  | HHS NTP                                 |       |
| Cancer Classification (CC)                  | Male.Rats N   | no units  | HHS NTP                                 |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 50    | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 600   | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 0.25  | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 18    | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 0.05  | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 6     | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 3.15  | percent   | EPA Chemistry Dashboard         |       |
| TD50                                             | 222   | mg/kg/day | NIH CPDB                        | max   |
| TD50                                             | 92.4  | mg/kg/day | NIH CPDB                        | min   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0004656 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.366     | no units | TEST QSAR |       |
| Developmental toxin test | 0.724     | no units | TEST QSAR |       |



**Dimethoate**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 283              | USEPA. 2007. Revised Interim Reregistration Decision for Dimethoate. Available on the Internet at: <a href="http://www.epa.gov/pesticides/reregistration/REDs/dimethoate_ired_revised.pdf">http://www.epa.gov/pesticides/reregistration/REDs/dimethoate_ired_revised.pdf</a> .                                                                                                                                                     |
| 284              | USEPA. 2007. Unregulated Contaminant Monitoring Regulation (UCMR) for Public Water Systems Revisions. Federal Register. Vol. 72, No. 2, p. 367, January 4, 2007.                                                                                                                                                                                                                                                                   |
| 310              | USEPA. 2010. Data Management and Analytical Plan for the Second Unregulated Contaminant Monitoring Regulation (UCMR 2) Data. June 2010 Draft Report Submitted to EPA.                                                                                                                                                                                                                                                              |
| 334              | USEPA. 2014. Regulatory Determinations 3 Support Document. April 2014. EPA Publication # 815-R14-003.                                                                                                                                                                                                                                                                                                                              |
| 350              | USEPA. 2015. Occurrence Data from the Second Unregulated Contaminant Monitoring Regulation (UCMR 2). Including Appendices A-C. EPA 815-R-15-013. December 2015.                                                                                                                                                                                                                                                                    |
| 360              | USEPA. 2015. Dimethoate: Human Health Risk Assessment for Registration Review. EPA-HQ-OPP-2009-0059-0027. DP No. D416010. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                               |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

## Di-n-butyl phthalate

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                                                                                                                                                                                                                    |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name:           | Di-n-butyl phthalate                                                                                                                                                                                                               |
| CASRN:          | 84-74-2                                                                                                                                                                                                                            |
| DTXSID:         | <a href="#">DTXSID2021781</a>                                                                                                                                                                                                      |
| Use:            | Plasticizer in nitrocellulose lacquers, elastomers, explosives, nail polish and solid rocket propellants; in perfumes; in textiles; in safety glass; insecticides; in printing inks; resin solvent; paper coatings; and adhesives. |
| Chemical Notes: |                                                                                                                                                                                                                                    |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxicants                              | X |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.00063                    |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 4       | reproductive and developmental effects | 10         | 7         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                    | Target Pop.               | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------------------------------------------------|---------------------------|-------------------|----------------------|
| HRL                                                      | 3000                   | "Increased incidence of retained areolas and nipple in the male offspring of rats" | women of childbearing age | ATSDR             | 2001                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 1.9                          | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Di-n-butyl phthalate

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study         | Critical Effect                                                                    | Target Population         | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|------------------------|------------------------------------------------------------------------------------|---------------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.1   | mg/kg/day | IRIS 1987         | Smith 1953             | increased mortality                                                                | general population        | 33.8                        | 592        | [188]                    |       |
| Reference Dose (RfD) or Equivalent | 0.1   | mg/kg/day | OW 1991           | Smith 1953             | "absense of increased mortality and hemotological effects"                         | general population        | 33.8                        | 592        | [211]                    |       |
| Reference Dose (RfD) or Equivalent | 0.5   | mg/kg/day | ATSDR 2001        | Mylchreest et al. 2000 | "Increased incidence of retained areolas and nipple in the male offspring of rats" | women of childbearing age | 35.4                        | 2820       | [17]                     |       |
| Cancer Classification (CC)         | D     |           | IRIS 1987         |                        |                                                                                    |                           |                             |            | [188]                    |       |
| Cancer Classification (CC)         | D     |           | OW 1991           |                        |                                                                                    |                           |                             |            | [211]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Neurological                | 0.01                        | Hoshi, 2009        | Developmental;               | 2000                         | Dobrzynska, 2011;   | 2000-09-01           | 2019-12-17         | 1867                                           | 80                                              | 64                                             | 50                                                |

## Other Health Data

| Data Element                                      | Value | Units | Source                            | Notes |
|---------------------------------------------------|-------|-------|-----------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |       |       |                                   |       |
| Acute Health-Based Guidance Value                 | 0.02  | mg/L  | MN DOH                            |       |
| Acute Health-Based Guidance Value                 | 0.02  | mg/L  | MN DOH                            |       |
| Chronic Health-Based Guidance Value               | 0.02  | mg/L  | MN DOH                            |       |
| Human Health Ambient Water Quality Criteria       | 0.02  | mg/L  | EPA Human Health Criteria for CWA |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.02  | mg/L  | MN DOH                            |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 10000 | mg/kg   | NIH HSDB                | max   |
| LD50                                             | 4840  | mg/kg   | NIH HSDB                | min   |
| Percent of active toxcast in vitro assays tested | 9.76  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0436516 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.09      | no units | TEST QSAR |       |
| Developmental toxin test | 0.71      | no units | TEST QSAR |       |

Di-n-butyl phthalate  
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OCCURRENCE DATA

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## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 22                                  | 4                    | Sites                 | 18                      | 0.3                        | 1.5                       | 1.9                          | 2                          | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 13                                  | 4                    | Sites                 | 31                      | 0.3                        | 1.5                       | 1.9                          | 2                          | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9                                   | 0                    | Sites                 | 0                       |                            |                           |                              |                            |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) | 1M - 10M                     |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 26                                  | 1                    | Sites                  | 3.85                    | 0.002                      | 0.034                     | 0.129                        | 0.137                      | ug/L        |       |
| Drinking Water Monitoring Data - WA (Finished)                | 2006 - 2011 | 483                                 | 2                    | Sites                  | 0.41                    | 0.637                      | 1.3                       | 14.2                         | 26.4                       | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 247                                 | 7                    | Sites                  | 2.83                    | 0.006                      | 0.178                     | 6.76                         | 8.1                        | ug/L        |       |
| Drinking Water Monitoring Data - FL (Source)                  | 2006 - 2011 | 1                                   | 1                    | Sites                  | 100                     | 1.1                        | 1.1                       | 1.1                          | 1.1                        | ug/L        |       |
| Drinking Water Monitoring Data - WA (Source)                  | 2006 - 2011 | 638                                 | 8                    | Sites                  | 1.25                    | 0.477                      | 1.5                       | 3.42                         | 6                          | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 154                                 | 25                   | Sites                  | 16                      | 0.11                       | 0.44                      | 5                            | 5                          | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 360                                 | 46                   | Sites                  | 13                      | 0.04                       | 0.09                      | 0.377                        | 1.65                       | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 514                                 | 71                   | Sites                  | 14                      | 0.04                       | 0.13                      | 0.865                        | 5                          | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                       | <b>Value</b>         | <b>Units</b>           | <b>Model</b>            | <b>Notes</b>               |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expocast exposure                                  |      | 0.00008                                       |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value     | Units                   | Notes |
|-------------------------------------------------------------------|------------|-----------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 4.33363   | days                    |       |
| Boiling point                                                     | OPERA QSAR | 332.592   | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 348.35    | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.0000243 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.0000263 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0000362 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0000407 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 134.136   | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 11.17     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.0000012 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 4.5098    | no units                |       |

**Di-n-butyl phthalate**

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| Reference Number | Full Reference                                                                                                                                                                                                |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 17               | ATSDR. 2001. Toxicological Profile for Di-n-Butyl Phthalate. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.      |
| 188              | USEPA. 1987. Chemical Assessment Summary di-n-butyl phthalate. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, DC. |
| 211              | USEPA. 1991. Drinking Water Criteria Document for Phthalic Acid Esters (PAES). U.S. Environmental Protection Agency, Office of Water, Health and Ecological Criteria Division, Washington, DC.                |

**Diuron**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Diuron                        |
| CASRN:          | 330-54-1                      |
| DTXSID:         | <a href="#">DTXSID0020446</a> |
| Use:            | Herbicide (HSD8)              |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 1.1                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 4       | carcinogen with linear MOA | 4          | 7         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect            | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 2                      | urinary bladder carcinomas | general population | OPP               | 2015                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 2.1                          | 90th Percentile                               | Finished Water                       | UCMR1  | 2001-2003 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     | X     | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



Diuron  
CCL 5 Contaminant Information Sheet  
HEALTH EFFECTS DATA  
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## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units          | Assessment Source | Critical Study                                                                      | Critical Effect                                 | Target Population  | Exposure Factor (mL/kg- | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|----------------|-------------------|-------------------------------------------------------------------------------------|-------------------------------------------------|--------------------|-------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.001  | mg/kg/day      | OPP 2015          | Schmidt, 1985; Rossberg & Wirnitzer, 1985; Rossberg, 1995; Malek, 1997              | hemolytic anemia and compensatory hematopoiesis | general population | 33.8                    | 5.92       | [342]                    |       |
| Cancer Slope Factor (CSF)          | 0.0191 | (mg/kg/day)^-1 | OPP 2015          | Schmidt 1985; Rossberg and Wirnitzer, 1985; Rossberg, 1995; Malek 1997; Eiben, 1983 | urinary bladder carcinomas                      | general population | 33.8                    | 1.55       | [342]                    |       |
| Cancer Classification (CC)         | L      |                | OPP 2015          |                                                                                     |                                                 |                    |                         |            | [342]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg- | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                         |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units | Source                             | Notes |
|---------------------------------------------|-------|-------|------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |                                    |       |
| 10-day Health Advisory                      | 1     | mg/L  | EPA DWSHA 2018                     |       |
| Lifetime Health Advisory                    | 0.002 | mg/L  | EPA DWSHA 2018                     |       |
| Maximum Allowable Concentration (MAC)       | 0.15  | mg/L  | Canadian Drinking Water Guidelines |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value  | Units     | Source                          | Notes |
|--------------------------------------------------|--------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |        |           |                                 |       |
| LD50                                             | 1017   | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 3400   | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 1      | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 640.13 | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 10     | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 77.5   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 7.46   | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0047098 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.027     | no units | TEST QSAR |       |
| Developmental toxin test | 0.759     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Diuron  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 | 293                           | 1                 | Sites               | 0.34                 | 2.1                     | 2.1                    | 2.1                       | 2.1                     | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 7,756                         | 698               | Sites               | 9                    | 0.00021                 | 0.0256                 | 0.24                      | 27.7                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 1,199                         | 452               | Sites               | 38                   | 0.00021                 | 0.0253                 | 0.24                      | 27.7                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 6,557                         | 246               | Sites               | 3.75                 | 0.00054                 | 0.03                   | 0.25                      | 5.53                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 47               | 3,410,787                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 9                | 37,175                     | Chemical Data Reporting (CDR) Results (EPA) (2016) | 100K - 500K                  |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 26                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 15                            | 10                | Sites               | 67                   | 0.0027                  | 0.0072                 | 0.057                     | 1.3                     | ug/L        |       |
| Bradley et al. 2018 (Finished) [53]                                                    | 2016        | 26                            | 1                 | Sites               | 3.85                 | 0.0041                  | 0.0041                 | 0.0041                    | 0.0041                  | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 213                           | 9                 | Sites               | 4.23                 | 1.2                     | 3.5                    | 3.5                       | 3.5                     | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 560                           | 255               | Sites               | 46                   | 0.00102                 | 0.0208                 | 0.138                     | 25                      | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 1,240                         | 47                | Sites               | 3.79                 | 0.00266                 | 0.02                   | 0.105                     | 0.487                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 1,800                         | 302               | Sites               | 17                   | 0.00102                 | 0.0206                 | 0.135                     | 25                      | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 227                           | 37                | Sites               | 16                   | 0.0027                  | 0.013                  | 0.06                      | 1.2                     | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 29                | Sites               | 13                   | 0.0027                  | 0.0141                 | 0.0589                    | 0.134                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 10                            | 8                 | Sites               | 80                   | 0.0027                  | 0.012                  | 0.06                      | 1.2                     | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 8,018                         | 1,811             | Sites               | 23                   | 0.0032                  | 0.41                   | 4.2                       | 860                     | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 20                | Sites               | 53                   | 0.0024                  | 0.0256                 | 0.193                     | 1.362                   | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 19                | Sites               | 2.75                 | 5e-04                   | 0.0225                 | 0.0758                    | 0.121                   | ug/L        |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                                     | 2002 - 2010 | 126                           | 21                | Samples             | 17                   |                         |                        |                           | 6.07                    | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 1.31E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.55395     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 323.013     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 298.055     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 8.24E-08    | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.00000828  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000238919 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00027227  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 15.9255     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 22.9087     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 1.06E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.55186     | no units                |       |

**Diuron**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985.                                                                    |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 342              | USEPA. 2015. Diuron. Human Health Assessment Scoping Document in Support of Registration Review. EPA-HQ-OPP-2015-0077-0004. DP No. D423231. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                             |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

## EPTC

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                               |
|-----------------|-------------------------------|
| Name:           | EPTC                          |
| CASRN:          | 759-94-4                      |
| DTXSID:         | <a href="#">DTXSID1024091</a> |
| Use:            | Herbicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.00024                    |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                        | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 300                    | decreased body weight and increased incidences of myocardial and neuromuscular lesions | general population | OPP               | 2017                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0724                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2 | RD 3           |
|----------------|------|----------------|
| Not Applicable | X    | Not Applicable |

## Basis

EPTC does not appear to occur at health levels of concern in PWSs and EPA has made a determination that terbacil does not present a meaningful opportunity for health risk reduction. While EPTC has been found in ambient waters at levels less than the HRL of 175 µg (as well as ½ the HRL) [a,b], it was not found in the UCMR 1 survey of public water supplies [c].

[a] Kolpin & Martin, 2003 [123]; [b] Martin, Crawford, & Larson, 2003 [134]; [c] USEPA, 2008 [297]; as cited in USEPA, 2008 [296]

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

EPTC  
CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                                                                        | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|----------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.05  | mg/kg/day | OPP 2017          | Warner 1983    | decreased body weight and increased incidences of myocardial and neuromuscular lesions | general population | 33.8                        | 296        | [382]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2017          |                |                                                                                        |                    |                             |            | [382]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                      | Value | Units     | Source                                  | Notes |
|---------------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |       |           |                                         |       |
| Acute Health-Based Guidance Value                 | 0.3   | mg/L      | MN DOH                                  |       |
| Acute Health-Based Guidance Value                 | 0.3   | mg/L      | MN DOH                                  |       |
| Acute Human Health Benchmark                      | 1     | mg/L      | EPA HHBP                                |       |
| Acute PAD                                         | 0.2   | mg/kg/day | EPA HHBP                                |       |
| Chronic Health-Based Guidance Value               | 0.04  | mg/L      | MN DOH                                  |       |
| Chronic Health-Based Guidance Value               | 0.2   | mg/L      | MN DOH                                  |       |
| Chronic Human Health Benchmark                    | 0.3   | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                      | 0.3   | mg/L      | Health-based screening levels from USGS |       |
| Maximum Allowable Daily Level                     | 700   | ug/day    | CalEPA OEHHA Chemical Database          |       |
| Population-Adjusted Dose (PAD)                    | 0.05  | mg/kg/day | EPA HHBP                                |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.09  | mg/L      | MN DOH                                  |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 112   | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 2550  | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 300   | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 8     | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 1     | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 100   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 3.64  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 15    | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 45    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 15    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 3     | mg/kg/day | EPA Toxicity Reference Database | min   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0048753 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.356     | no units | TEST QSAR |       |
| Developmental toxin test | 0.59      | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

EPTC  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

July 2021

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 | 3,873                         | 0                 | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 10,705                        | 423               | Sites               | 3.95                 | 4.00E - 04              | 0.008                  | 0.0724                    | 40                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,055                         | 369               | Sites               | 18                   | 4.00E - 04              | 0.008                  | 0.0722                    | 40                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 8,650                         | 54                | Sites               | 0.62                 | 0.001                   | 0.0047                 | 0.0607                    | 0.952                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 29               | 3,047,799                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 1                | 170                        | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 58                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WA (Finished)                                         | 2006 - 2011 | 482                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 1                 | Sites               | 5.88                 | 0.017                   | 0.028                  | 0.06                      | 0.068                   | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 315                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WA (Source)                                           | 2006 - 2011 | 634                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 936                           | 32                | Sites               | 3.42                 | 4.00E - 04              | 0.0061                 | 0.0474                    | 0.838                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 2,019                         | 16                | Sites               | 0.79                 | 0.0017                  | 0.0115                 | 0.103                     | 0.168                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 2,954                         | 48                | Sites               | 1.62                 | 4.00E - 04              | 0.00705                | 0.0637                    | 0.838                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 2                 | Sites               | 0.87                 | 0.008                   | 0.028                  | 0.137                     | 0.2                     | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 2                 | Sites               | 17                   | 0.008                   | 0.028                  | 0.137                     | 0.2                     | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 3,722                         | 391               | Sites               | 11                   | 0.002                   | 0.0228                 | 0.5                       | 23                      | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 4                 | Sites               | 11                   | 0.0116                  | 0.0708                 | 0.196                     | 0.224                   | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 1                 | Sites               | 0.14                 | 0.016                   | 0.016                  | 0.016                     | 0.016                   | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                                  |      | 5.95E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|-------------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.73295    | days                    |       |
| Boiling point                                                     | OPERA QSAR | 215.91     | degree C                |       |
| Boiling point                                                     | TEST QSAR  |            |                         |       |
| Vapor pressure                                                    | OPERA QSAR | 0.0226925  | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.011508   | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.00143197 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.00174582 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 23.7326    | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 14.6893    | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.00000125 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 3.21713    | no units                |       |

**EPTC**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 123              | Kolpin, D.W. and J.D. Martin. 2003. Pesticides in Ground Water: Summary Statistics; Preliminary Results from Cycle I of the National Water Quality Assessment Program (NAWQA), 1992-2001. Available on the Internet at: <a href="http://ca.water.usgs.gov/pnsp/pestgw/Pest-GW_2001_Text.html">http://ca.water.usgs.gov/pnsp/pestgw/Pest-GW_2001_Text.html</a> .                                                                    |
| 134              | Martin, J.D., C.G. Crawford, and S.J. Larson. 2003. Pesticides in Streams: Summary Statistics; Preliminary Results from Cycle I of the National Water Quality Assessment Program (NAWQA), 1992-2001. Available on the Internet at: <a href="http://ca.water.usgs.gov/pnsp/pestsw/Pest-SW_2001_Text.html">http://ca.water.usgs.gov/pnsp/pestsw/Pest-SW_2001_Text.html</a> .                                                         |
| 296              | USEPA. 2008. Regulatory Determinations Support Document for Selected Contaminants from the Second Drinking Water Contaminant Candidate List (CCL 2). EPA Report 815-R-08-012. June 2008.                                                                                                                                                                                                                                           |
| 297              | USEPA. 2008. The Analysis of Occurrence Data from the First Unregulated Contaminant Monitoring Regulation (UCMR 1) in Support of Regulatory Determinations for the Second Drinking Water Contaminant Candidate List. EPA 815-R-08-013. June.                                                                                                                                                                                       |
| 382              | USEPA. 2017. EPTC: (S-Ethyl dipropylthiocarbamate) Acute and Chronic Aggregate Dietary (Food and Drinking Water), Exposure and Risk Assessments for Registration Review. EPA-HQ-OPP-2012-0720-0019. DP No. D439764. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                     |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**Esfenvalerate**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Esfenvalerate                 |
| CASRN:          | 66230-04-4                    |
| DTXSID:         | <a href="#">DTXSID4032667</a> |
| Use:            | Insecticide; medication       |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 1.5                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 6       | reproductive and developmental effects | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect            | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 5                      | reduced locomotor activity | bottle-fed infants | OPP               | 2017                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|------|
| 7.54                         |                                               | EDWC SW (acute)                      | OPP    | 2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study       | Critical Effect            | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|----------------------|----------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0037 | mg/kg/day | OPP 2017          | Wolansky et al. 2006 | reduced locomotor activity | bottle-fed infants | 151                         | 4.90       | [383]                    |       |
| Cancer Classification (CC)         | E      |           | OPP 2017          |                      |                            |                    |                             |            | [383]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value  | Units     | Source                                  | Notes |
|---------------------------------------------|--------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |        |           |                                         |       |
| Acute Human Health Benchmark                | 0.012  | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.0018 | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.012  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.012  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.0018 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| Acute LOAEL                                      | 7.5   | mg/kg/day | EPA Toxicity Reference Database |       |
| Acute NOAEL                                      | 2.5   | mg/kg/day | EPA Toxicity Reference Database |       |
| LD50                                             | 325   | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 88    | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 2.5   | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 3     | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 11.45 | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 7.5   | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 75    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 2.5   | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 22.5  | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0006934 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.3       | no units | TEST QSAR |       |
| Developmental toxin test | 0.75      | no units | TEST QSAR |       |

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 2,965                               | 0                    | Sites                 | 0                       |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 645                                 | 0                    | Sites                 | 0                       |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 2,320                               | 0                    | Sites                 | 0                       |                            |                           |                              |                            |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 47               | 157,875                      | 2016 | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects                                   | Minimum Conc.<br>(Detects)                                                                                                                                                                                                                                                          | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                                     |                      |                        |                                                           |                                                                                                                                                                                                                                                                                     |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 15                                  | 0                    | Sites                  | 0                                                         |                                                                                                                                                                                                                                                                                     |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                                                   |             |                                     |                      |                        |                                                           |                                                                                                                                                                                                                                                                                     |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 140                                 | 0                    | Sites                  | 0                                                         |                                                                                                                                                                                                                                                                                     |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 3                                   | 0                    | Sites                  | 0                                                         |                                                                                                                                                                                                                                                                                     |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 143                                 | 0                    | Sites                  | 0                                                         |                                                                                                                                                                                                                                                                                     |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 119                                 | 0                    | Sites                  | 0                                                         |                                                                                                                                                                                                                                                                                     |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 111                                 | 0                    | Sites                  | 0                                                         |                                                                                                                                                                                                                                                                                     |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 8                                   | 0                    | Sites                  | 0                                                         |                                                                                                                                                                                                                                                                                     |                           |                              |                            |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 4,983                               | 152                  | Sites                  | 3.05                                                      | 0.000335                                                                                                                                                                                                                                                                            | 0.015                     | 0.134                        | 3.48                       | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                                     |                      |                        |                                                           |                                                                                                                                                                                                                                                                                     |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                                                           |                                                                                                                                                                                                                                                                                     |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                                                           |                                                                                                                                                                                                                                                                                     |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                                                           |                                                                                                                                                                                                                                                                                     |                           |                              |                            |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                       | <b>Value</b>         | <b>Units</b>           | <b>Model</b>                                              | <b>Notes</b>                                                                                                                                                                                                                                                                        |                           |                              |                            |             |       |
| Estimated Drinking Water Concentration (EDWC) in Surface Water (acute)                 | 2017        | OPP                                 | 7.54                 | ug/L                   | Tier I, FQPA Index Reservoir Screening Tool (FIRST) Model | The critical effect of reduced locomotor activity was based on an acute population adjusted dose and is considered a less-than-chronic response. To account for this, the modeled surface water acute concentration was selected as the occurrence concentration for esfenvalerate. |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expcast exposure                                   |      | 0.0000017                                     |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.35348     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 434.894     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 456.288     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 1.64E-09    | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 1.31E-09    | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000000197 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000000282 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 646.164     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 240.991     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 7.95E-08    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 6.17889     | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                  |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 383              | USEPA. 2017. Esfenvalerate. Draft Human Health Risk Assessment for Registration Review. EPA-HQ-OPP-2009-0301-0074. DP No. D414149. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                   |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society. |

**Ethalfuralin**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                        |                                                                                      |
|------------------------|--------------------------------------------------------------------------------------|
| <b>Name:</b>           | Ethalfuralin                                                                         |
| <b>CASRN:</b>          | 55283-68-6                                                                           |
| <b>DTXSID:</b>         | <a href="#">DTXSID8032386</a>                                                        |
| <b>Use:</b>            | Herbicide used on used on beans, watermelons, sunflowers, cantaloupes, and cucumbers |
| <b>Chemical Notes:</b> |                                                                                      |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                                 |                                   |
|---------------------------------|-----------------------------------|
| <b>Draft CCL5 List Decision</b> | <b>Final Hazard Quotient (HQ)</b> |
| List                            | 0.25                              |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 4       | carcinogen with linear MOA | 6          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                   | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.3                    | mammary gland fibro-adenomas and combined adenomas/fibro-adenomas | general population | OPP               | 2016                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0751                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                          |
|--------------------------|
| <b>Public Nomination</b> |
|                          |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**Ethalfuralin**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units          | Assessment Source | Critical Study                | Critical Effect                                                                                                                               | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|----------------|-------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.04  | mg/kg/day      | OPP 2016          | Adams 1985                    | increased urinary bilirubin, variations in erythrocyte morphology, increased thrombocyte count, increased erythroid series of the bone marrow | general population | 33.8                        | 237        | [365]                    |       |
| Cancer Slope Factor (CSF)          | 0.089 | (mg/kg/day)^-1 | OPP 2016          | Adams et al. 1981; Adams 1981 | mammary gland fibro-adenomas and combined adenomas/fibro-adenomas                                                                             | general population | 33.8                        | 0.332      | [365]                    |       |
| Cancer Classification (CC)         | C     |                | OPP 2016          |                               |                                                                                                                                               |                    |                             |            | [365]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                | Value   | Units          | Source                                  | Notes |
|---------------------------------------------|---------|----------------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |         |                |                                         |       |
| Acute Human Health Benchmark                | 21      | mg/L           | EPA HHBP                                |       |
| Acute PAD                                   | 0.75    | mg/kg/day      | EPA HHBP                                |       |
| Cancer Slope Factor (CSF)                   | 0.089   | (mg/kg/day)^-1 | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.3     | mg/L           | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.00036 | mg/L           | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.3     | mg/L           | Health-based screening levels from USGS |       |
| Health-Based Screening Level                | 0.00036 | mg/L           | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.04    | mg/kg/day      | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 5000  | mg/kg     | NIH HSDB                        |       |
| LOAEL                                            | 20    | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 250   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 4     | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 50    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 7.89  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 125   | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 27.5  | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0147571 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.628     | no units | TEST QSAR |       |
| Developmental toxin test | 1.214     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Ethalfuralin  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 8,238                         | 59                | Sites               | 0.72                 | 0.001                   | 0.014                  | 0.0751                    | 0.768                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 1,828                         | 54                | Sites               | 2.95                 | 0.001                   | 0.014                  | 0.0742                    | 0.768                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 6,410                         | 5                 | Sites               | 0.08                 | 0.004                   | 0.005                  | 0.048                     | 0.09                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 45               | 1,391,050                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 15                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 333                           | 2                 | Sites               | 0.6                  | 0.0016                  | 0.0044                 | 0.00762                   | 0.009                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 615                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 948                           | 2                 | Sites               | 0.21                 | 0.0016                  | 0.0044                 | 0.00762                   | 0.009                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 225                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 218                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 8                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 1,348                         | 24                | Sites               | 1.78                 | 0.005                   | 0.031                  | 0.0751                    | 0.13                    | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 0.000000105                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.53726     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 350.978     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 350.199     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.0000691   | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.00000379  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00000666  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00000234  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 199.31      | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 184.502     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000000345 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 5.13595     | no units                |       |

**Ethalfuralin**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                  |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 365              | USEPA. 2016. Ethalfuralin: Human Health Draft Risk Assessment for Registration Review. EPA-HQ-OPP-2011-0094-0016. DP No. D429844. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                    |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society. |

**Ethion**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                       |
|-----------------|-------------------------------------------------------|
| Name:           | Ethion                                                |
| CASRN:          | 563-12-2                                              |
| DTXSID:         | <a href="#">DTXSID2024086</a>                         |
| Use:            | Insecticide                                           |
| Chemical Notes: | Canceled pesticide. Last end of use date: 12/31/2004. |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxics                                 | X |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.0029                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 7       | non-cancer effects | 2          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                             | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 3                      | plasma, red blood cell, and brain cholinesterase inhibition | general population | OPP               | 2001                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0088                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



## Ethion

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study | Critical Effect                                             | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                       |
|------------------------------------|--------|-----------|-------------------|----------------|-------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-----------------------------|
| Reference Dose (RfD) or Equivalent | 0.0005 | mg/kg/day | OPP 2001          | Bailey 1989    | plasma, red blood cell, and brain cholinesterase inhibition | general population | 33.8                        | 2.96       | [245]                    | NOTE: canceled registration |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source    | Notes |
|---------------------------------------------|-------|-----------|-----------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |           |       |
| Acute Minimal Risk Level (MRL)              | 0.002 | mg/kg/day | CDC ATSDR |       |
| Intermediate Minimal Risk Level (MRL)       | 0.002 | mg/kg/day | CDC ATSDR |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 208       | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 24.4      | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 0.049     | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 9.6000004 | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 2.4       | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 0.028     | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 10.88     | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0000755 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.338     | no units | TEST QSAR |       |
| Developmental toxin test |           |          | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
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EPA - Office of Water

Ethion  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 3,699                         | 6                 | Sites              | 0.16                 | 0.003                   | 0.0065                 | 0.0088                    | 0.01                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 402                           | 3                 | Sites              | 0.75                 | 0.004                   | 0.008                  | 0.0094                    | 0.01                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 3,297                         | 3                 | Sites              | 0.09                 | 0.003                   | 0.005                  | 0.0071                    | 0.008                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 1                | 0.661                     | 2015 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 15                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 470                           | 1                 | Sites               | 0.21                 | 0.108                   | 0.108                  | 0.108                     | 0.108                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 2,012                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 2,481                         | 1                 | Sites               | 0.04                 | 0.108                   | 0.108                  | 0.108                     | 0.108                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 123                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 114                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 10                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 614                           | 2                 | Sites               | 0.33                 | 0.01                    | 0.03                   | 0.046                     | 0.05                    | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 106                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                   |      | 0.000000118                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 526.103     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 395.284     | degree C                |       |
| Boiling point                                                     | TEST QSAR  |             |                         |       |
| Vapor pressure                                                    | OPERA QSAR | 0.00000179  | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.00000561  | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.00000621  | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0000151   | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 242.157     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 58.3445     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.000000452 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 4.72384     | no units                |       |

**Ethion**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 245              | USEPA. 2001. Ethion RED. U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Washington, D.C.                                                                                                                                                                                                                                                                                             |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                    |

**Ethoprop**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Ethoprop                      |
| CASRN:          | 13194-48-4                    |
| DTXSID:         | <a href="#">DTXSID4032611</a> |
| Use:            | Insecticide                   |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxicants                              | X |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.063                      |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 6       | reproductive and developmental effects | 2          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                     | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.9                    | inhibition of red blood cell cholinesterase in pups | bottle-fed infants | OPP               | 2015                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0563                       | 90th Percentile                               | Finished Water                       | UCMR4  | 2018-2019 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Ethoprop

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value   | Units          | Assessment Source | Critical Study       | Critical Effect                                     | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|---------|----------------|-------------------|----------------------|-----------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.00065 | mg/kg/day      | OPP 2015          | Chartier et al. 2005 | inhibition of red blood cell cholinesterase in pups | bottle-fed infants | 151                         | 0.861      | [343]                    |       |
| Cancer Slope Factor (CSF)          | 0.0281  | (mg/kg/day)^-1 | OPP 2015          | Williams 1992        | malignant adrenal pheochromocytomas in males        | general population | 33.8                        | 1.05       | [343]                    |       |
| Cancer Classification (CC)         | L       |                | OPP 2015          |                      |                                                     |                    |                             |            | [343]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value   | Units          | Source                                  | Notes |
|---------------------------------------------|---------|----------------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |         |                |                                         |       |
| Acute Human Health Benchmark                | 0.051   | mg/L           | EPA HHBP                                |       |
| Acute PAD                                   | 0.0076  | mg/kg/day      | EPA HHBP                                |       |
| Cancer Slope Factor (CSF)                   | 0.0281  | (mg/kg/day)^-1 | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.00114 | mg/L           | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.009   | mg/L           | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.00114 | mg/L           | Health-based screening levels from USGS |       |
| Health-Based Screening Level                | 0.009   | mg/L           | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.0014  | mg/kg/day      | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 216   | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 5.62  | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 0.254 | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 24    | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 13    | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 0.032 | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 3.88  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 0.025 | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 0.01  | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0001291 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | -0.038    | no units | TEST QSAR |       |
| Developmental toxin test | 0.477     | no units | TEST QSAR |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 14               | 883,037                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

## Non-Nationally Representative Water Data

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                                  |      | 8.62E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

UCMR 4 data used in the draft CCI 5 is a partial dataset and will be complete in Dec. 2020.

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**Ethoprop**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 343              | USEPA. 2015. Ethoprop. Preliminary Occupational and Residential Exposure/Risk Assessment for Registration Review. EPA-HQ-OPP-2008-0560-0056. DP No. D421954. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                            |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**Ethyl citrate**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                                                                                   |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Name:           | Ethyl citrate                                                                                                                     |
| CASRN:          | 77-93-0                                                                                                                           |
| DTXSID:         | <a href="#">DTXSID0040701</a>                                                                                                     |
| Use:            | Solvent and plasticizer for nitrocellulose and natural resins, softener, paint removers, agglutinant, perfume base, food additive |
| Chemical Notes: |                                                                                                                                   |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxicants                              |  |
| PubMed Neurotoxicants                             |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.0000095                  |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 3       | no adverse effects | 9          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect         | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 20000                  | no adverse effect level | general population |                   |                      |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.19                         | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



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HEALTH EFFECTS DATA

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## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|--------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                          |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value | Units     | Assessment Source | Critical Study             | Critical Effect         | Target Population  | Exposure Factor (mL/kg-) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                                                  |
|------------------------------------|-------|-----------|-------------------|----------------------------|-------------------------|--------------------|--------------------------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 4     | mg/kg/day |                   | Finkelstein and Gold, 1959 | no adverse effect level | general population | 33.8                     | 23700                      | [78]                     | NOTE: No health assessments found; NOAEL/UF used in place of the RfD, NOAEL obtained from a study identified by the rapid systematic literature review |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects                                                                                     | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------------------------------------------------------------------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    | Endocrine, Systemic, Renal, Immunological, Hepatic, Gastrointestinal, Respiratory, Cardiovascular, Hematological | 4000                         | Finkelstein, 1959   |                      | 2020-04-14         | 83                                             | 2                                               | 0                                              | 1                                                 |

## Other Health Data

| Data Element                         | Value | Units | Source | Notes |
|--------------------------------------|-------|-------|--------|-------|
| Measured Data and Assessment Results |       |       |        |       |
|                                      |       |       |        |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
The full citation for the critical study is provided in the corresponding health assessment.  
PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| Measured Data and Assessment Results             |       |         |                         |       |
| LD50                                             | 3200  | mg/kg   | NIH HSDB                | min   |
| LD50                                             | 35000 | mg/kg   | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 1.2   | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| Modeled Data             |           |          |           |       |
| LD50                     | 0.0146893 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.349     | no units | TEST QSAR |       |
| Developmental toxin test | 0.701     | no units | TEST QSAR |       |

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OCCURRENCE DATA

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## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 567                           | 17                | Sites               | 3                    | 0.01                    | 0.04                   | 0.19                      | 0.48                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 88                            | 16                | Sites               | 18                   | 0.01                    | 0.04                   | 0.186                     | 0.43                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 479                           | 1                 | Sites               | 0.21                 | 0.48                    | 0.48                   | 0.48                      | 0.48                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) | 1M - 10M                     |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                            | NA                | Sites               | 4                    |                         | 0.013                  |                           | 0.013                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 715                           | 197               | Sites               | 28                   | 0.01                    | 0.06                   | 14.2                      | 334                     | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 689                           | 10                | Sites               | 1.45                 | 0.01                    | 0.02                   | 0.04                      | 0.09                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,404                         | 207               | Sites               | 15                   | 0.01                    | 0.06                   | 14                        | 334                     | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                            | 15                | Sites               | 39                   | 0.0266                  | 0.11                   | 0.462                     | 0.694                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                             | 1                 | Sites               | 50                   |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                            | 19                | Sites               | 90                   | 0.14                    | 0.47                   | 1.28                      | 2                       | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                                  |      | 0.0000592                               |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.81755     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 292.74      | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 316.611     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.000485688 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.0000562   | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.229189    | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0166725   | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 3.52492     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 1.36144     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 2.49E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 0.512786    | no units                |       |

**Ethyl citrate**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                          |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.        |
| 78               | Finkelstein M. and Gold, H. 1959. Toxicology of the citric acid esters: tributyl citrate, acetyl tributyl citrate, triethyl citrate, and acetyl triethyl citrate. <i>Toxicology and applied pharmacology</i> . 1(283-98).                                                                               |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922). |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                      |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.        |

## Famoxadone

CCL 5 Contaminant Information Sheet

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Famoxadone                    |
| CASRN:          | 131807-57-3                   |
| DTXSID:         | <a href="#">DTXSID8034588</a> |
| Use:            | Fungicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.00074                    |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects | 1          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                      | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 8                      | microscopic lens lesions (cataracts) | general population | OPP               | 2015                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0059                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Famoxadone

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study            | Critical Effect                      | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|---------------------------|--------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0014 | mg/kg/day | OPP 2015          | Tompkins 1995; Salik 1995 | microscopic lens lesions (cataracts) | general population | 33.8                        | 8.28       | [344]                    |       |
| Cancer Classification (CC)         | NL     |           | OPP 2015          |                           |                                      |                    |                             |            | [344]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value  | Units     | Source                                  | Notes |
|---------------------------------------------|--------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |        |           |                                         |       |
| Chronic Human Health Benchmark              | 0.009  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.009  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.0014 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 5000      | mg/kg     | NIH HSDB                        |       |
| LOAEL                                            | 1000      | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 8.8000002 | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 1.2       | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 350       | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 26.49     | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 10        | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 534       | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 1.3       | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 79.9      | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0038548 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.201     | no units | TEST QSAR |       |
| Developmental toxin test | 0.803     | no units | TEST QSAR |       |

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,348                               | 1                    | Sites                 | 0.07                    | 0.0059                     | 0.0059                    | 0.0059                       | 0.0059                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 290                                 | 1                    | Sites                 | 0.34                    | 0.0059                     | 0.0059                    | 0.0059                       | 0.0059                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,058                               | 0                    | Sites                 | 0                       |                            |                           |                              |                            |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 36               | 56,460                       | 2016 | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 273                                 | 1                    | Sites                  | 0.37                    | 0.0091                     | 0.016                     | 0.0196                       | 0.0216                     | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 153                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 426                                 | 1                    | Sites                  | 0.23                    | 0.0091                     | 0.016                     | 0.0196                       | 0.0216                     | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 134                                 | 4                    | Sites                  | 2.99                    | 0.0091                     | 0.016                     | 0.0201                       | 0.0216                     | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 584                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Exposure exposure                                  |      | 0.000000023                                   |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.54781     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 408.651     | degree C                |       |
| Boiling point                                                     | TEST QSAR  |             |                         |       |
| Vapor pressure                                                    | OPERA QSAR | 6.94E-09    | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 1.3E-10     | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000000238 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.00000161  | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 83.2068     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 38.5478     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 5.34E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 4.59956     | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 344              | USEPA. 2015. Famoxadone. Human Health Assessment Scoping Document in Support of Registration Review. EPA-HQ-OPP-2015-0094-0002. DP No. D423286. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                         |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                    |

**Fenbuconazole**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Fenbuconazole                 |
| CASRN:          | 114369-43-6                   |
| DTXSID:         | <a href="#">DTXSID8032548</a> |
| Use:            | Fungicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 1.5                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 3       | carcinogen with linear MOA | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                      | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 8                      | hepatocellular adenomas and carcinomas in mice; thyroid follicular adenomas and combined adenomas/carcinomas in rats | general population | OPP               | 2019                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|------|
| 11.7                         |                                               | EDWC SW (chronic,                    | OPP    | 2019 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value   | Units          | Assessment Source | Critical Study             | Critical Effect                                                                                                      | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|---------|----------------|-------------------|----------------------------|----------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.03    | mg/kg/day      | OPP 2019          | Wolfe 1990                 | decreased body weight gain, increased thyroid weight, histopathological lesions in liver and thyroid gland           | general population | 33.8                        | 178        | [417]                    |       |
| Cancer Slope Factor (CSF)          | 0.00359 | (mg/kg/day)^-1 | OPP 2019          | Wolfe 1990 and 1991a and b | hepatocellular adenomas and carcinomas in mice; thyroid follicular adenomas and combined adenomas/carcinomas in rats | general population | 33.8                        | 8.24       | [417]                    |       |
| Cancer Classification (CC)         | C       |                | OPP 2019          |                            |                                                                                                                      |                    |                             |            | [417]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value   | Units          | Source   | Notes |
|---------------------------------------------|---------|----------------|----------|-------|
| <b>Measured Data and Assessment Results</b> |         |                |          |       |
| Acute Human Health Benchmark                | 8       | mg/L           | EPA HHBP |       |
| Acute PAD                                   | 0.3     | mg/kg/day      | EPA HHBP |       |
| Cancer Slope Factor (CSF)                   | 0.00359 | (mg/kg/day)^-1 | EPA HHBP |       |
| Chronic Human Health Benchmark              | 0.2     | mg/L           | EPA HHBP |       |
| Chronic Human Health Benchmark              | 0.00891 | mg/L           | EPA HHBP |       |
| Population-Adjusted Dose (PAD)              | 0.03    | mg/kg/day      | EPA HHBP |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LOAEL                                            | 3.75      | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 75        | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 0.38      | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 30        | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 17.11     | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 13.27     | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic LOAEL                                 | 5.0999999 | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 1.5       | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 5.7       | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0034834 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.752     | no units | TEST QSAR |       |
| Developmental toxin test | 0.488     | no units | TEST QSAR |       |

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 14                                  | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 14                                  | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 30               | 46,778                       | 2016 | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects                                                              | Minimum Conc.<br>(Detects)                                                                                                                                                                                                                                                                                                     | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                                     |                      |                        |                                                                                      |                                                                                                                                                                                                                                                                                                                                |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 13                                  | 1                    | Sites                  | 7.69                                                                                 | 0.057                                                                                                                                                                                                                                                                                                                          | 0.057                     | 0.057                        | 0.057                      | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                                     |                      |                        |                                                                                      |                                                                                                                                                                                                                                                                                                                                |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 132                                 | 0                    | Sites                  | 0                                                                                    |                                                                                                                                                                                                                                                                                                                                |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 3                                   | 0                    | Sites                  | 0                                                                                    |                                                                                                                                                                                                                                                                                                                                |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 135                                 | 0                    | Sites                  | 0                                                                                    |                                                                                                                                                                                                                                                                                                                                |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 121                                 | 0                    | Sites                  | 0                                                                                    |                                                                                                                                                                                                                                                                                                                                |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 114                                 | 0                    | Sites                  | 0                                                                                    |                                                                                                                                                                                                                                                                                                                                |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 8                                   | 0                    | Sites                  | 0                                                                                    |                                                                                                                                                                                                                                                                                                                                |                           |                              |                            |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 99                                  | 0                    | Sites                  | 0                                                                                    |                                                                                                                                                                                                                                                                                                                                |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                                     |                      |                        |                                                                                      |                                                                                                                                                                                                                                                                                                                                |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                                                                                      |                                                                                                                                                                                                                                                                                                                                |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                                                                                      |                                                                                                                                                                                                                                                                                                                                |                           |                              |                            |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                       | <b>Value</b>         | <b>Units</b>           | <b>Model</b>                                                                         | <b>Notes</b>                                                                                                                                                                                                                                                                                                                   |                           |                              |                            |             |       |
| Estimated Drinking Water Concentration (EDWC) in Surface Water (chronic, cancer)       | 2019        | OPP                                 | 11.7                 | ug/L                   | Tier II Pesticide Root Zone Model (PRZM) - Exposure Analysis Modeling System (EXAMS) | The modeled surface water chronic, cancer concentration provided by the most recent available EPA OPP health assessment was selected as the occurrence concentration for fenbuconazole. This value coincides with the critical effects of thyroid and liver adenomas and carcinomas provided within the health effects report. |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| ExpoCast exposure                                  |      | 0.000000133                                   |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|-------------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.3514     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 335.634    | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 445.687    | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 4.42E-08   | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 5.66E-09   | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0000013  | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0000166  | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 281.827    | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 132.739    | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.00000424 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 3.14361    | no units                |       |

**Fenbuconazole**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                  |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 417              | USEPA. 2019. Fenbuconazole: Human Health Risk Assessment for Proposed Use on Imported Tea. EPA-HQ-OPP-2018-0300-0004. DP No. D446940. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society. |

**Fenitrothion**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Fenitrothion                  |
| CASRN:          | 122-14-5                      |
| DTXSID:         | <a href="#">DTXSID4032613</a> |
| Use:            | Insecticide                   |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 | X |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.39                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 7       | reproductive and developmental effects |            |           |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                    | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.2                    | plasma cholinesterase inhibition and histopathology of lymph nodes | bottle-fed infants | OPP               | 2010                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.078                        | 90th Percentile                               | Ambient (SW) Water                   | SURF   | 1990-2018 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Fenitrothion

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value    | Units     | Assessment Source | Critical Study | Critical Effect                                                    | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|----------|-----------|-------------------|----------------|--------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.000125 | mg/kg/day | OPP 2010          | Spicer 1986    | plasma cholinesterase inhibition and histopathology of lymph nodes | bottle-fed infants | 151                         | 0.166      | [313]                    |       |
| Cancer Classification (CC)         | E        |           | OPP 2010          |                |                                                                    |                    |                             |            | [313]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value    | Units     | Source   | Notes |
|---------------------------------------------|----------|-----------|----------|-------|
| <b>Measured Data and Assessment Results</b> |          |           |          |       |
| Acute Human Health Benchmark                | 0.0017   | mg/L      | EPA HHBP |       |
| Acute PAD                                   | 0.00025  | mg/kg/day | EPA HHBP |       |
| Chronic Human Health Benchmark              | 0.0008   | mg/L      | EPA HHBP |       |
| Population-Adjusted Dose (PAD)              | 0.000125 | mg/kg/day | EPA HHBP |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 1720  | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 500   | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 0.25  | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 30    | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 0.125 | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 10    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 15.77 | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 1.5   | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 0.5   | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0001122 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.548     | no units | TEST QSAR |       |
| Developmental toxin test | 0.713     | no units | TEST QSAR |       |

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Draft Fifth Contaminant Candidate List (CCL 5)  
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**OCCURRENCE DATA**

**Scoring Data**

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

**Non-Scoring Data**

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects)                                                                                                                                                                                                                                      | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                                                                                                                                                                                                                                                              |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 0                 | Sites               | 0                    |                                                                                                                                                                                                                                                              |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                                                                                                                                                                                                                                                              |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 201                           | 0                 | Sites               | 0                    |                                                                                                                                                                                                                                                              |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 191                           | 0                 | Sites               | 0                    |                                                                                                                                                                                                                                                              |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 0                 | Sites               | 0                    |                                                                                                                                                                                                                                                              |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 2,406                         | 1                 | Sites               | 0.04                 | 0.078                                                                                                                                                                                                                                                        | 0.078                  | 0.078                     | 0.078                   | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                                                                                                                                                                                                                                                              |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                                                                                                                                                                                                                                                              |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                                                                                                                                                                                                                                                              |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>                                                                                                                                                                                                                                                 |                        |                           |                         |             |       |
|                                                                                        | 2010        | OPP                           |                   | ug/L                |                      | No modeled concentrations were provided by OPP because "it is highly unlikely that fenitrothion will reach drinking water resources..." due to its selective uses in bait traps. "The only route of [oral] exposure ... is in the diet from imported wheat." |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 0.000000078                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.49784     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 353.148     | degree C                |       |
| Boiling point                                                  | TEST QSAR  |             |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 0.0000185   | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000016    | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000156501 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0000621   | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 83.6872     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 57.1479     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000000596 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.37577     | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                  |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 313              | USEPA. 2010. Fenitrothion. Risk Assessment to Support Final Registration Review Decision. EPA-HQ-OPP-2009-0172-0016. DP No. D383647. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                 |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society. |

**Fenpropathrin**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Fenpropathrin                 |
| CASRN:          | 39515-41-8                    |
| DTXSID:         | <a href="#">DTXSID0024002</a> |
| Use:            | Insecticide                   |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.0016                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 5       | reproductive and developmental effects | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect        | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 20                     | reduced motor activity | bottle-fed infants | OPP               | 2016                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source  | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|---------|-----------|
| 0.0324                       | 90th Percentile                               | Ambient (SW) Water                   | CA SURF | 1990-2018 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



## Fenpropathrin

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study       | Critical Effect        | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------------|------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.017 | mg/kg/day | OPP 2016          | Wolansky et al. 2006 | reduced motor activity | bottle-fed infants | 151                         | 22.5       | [366]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2016          |                      |                        |                    |                             |            | [366]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source   | Notes |
|---------------------------------------------|-------|-----------|----------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |          |       |
| Acute Human Health Benchmark                | 0.11  | mg/L      | EPA HHBP |       |
| Acute PAD                                   | 0.017 | mg/kg/day | EPA HHBP |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 66.7      | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 70.6      | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 19.450001 | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 2         | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 0.4       | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 7.23      | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 12.5      | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 30        | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic LOAEL                                 | 6.25      | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 15        | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0004742 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.248     | no units | TEST QSAR |       |
| Developmental toxin test | 0.825     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
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EPA - Office of Water

Fenpropathrin

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**OCCURRENCE DATA**

**Scoring Data**

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 14                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 14                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 24               | 185,210                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

**Non-Scoring Data**

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects)                                                                                                                                                                                                                                                                                                                                 | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                                                                                                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 13                            | 0                 | Sites               | 0                    |                                                                                                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                                                                                                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 140                           | 0                 | Sites               | 0                    |                                                                                                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 3                             | 0                 | Sites               | 0                    |                                                                                                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 143                           | 0                 | Sites               | 0                    |                                                                                                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 121                           | 0                 | Sites               | 0                    |                                                                                                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 114                           | 0                 | Sites               | 0                    |                                                                                                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 8                             | 0                 | Sites               | 0                    |                                                                                                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 2,562                         | 29                | Sites               | 1.13                 | 0.001092                                                                                                                                                                                                                                                                                                                                                | 0.005                  | 0.0324                    | 2.979733                | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                                                                                                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                                                                                                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                                                                                                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>                                                                                                                                                                                                                                                                                                                                            |                        |                           |                         |             |       |
| Limit of solubility surrogate for occurrence concentration, Surface Water Peak         | 2016        | OPP                           | 10.3              | ug/L                |                      | Fenpropathrin is very insoluble in water and residues in drinking water are expected to be very low. Therefore, no modeling of estimated occurrence was conducted and the limit of solubility of fenpropathrin (10.3 ppb) reported in the most recent EPA OPP health assessment was used as a surrogate for the peak expected occurrence concentration. |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.0000001                               |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.53866     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 370.491     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 414.903     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00000331  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000000011 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0000003   | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.000000228 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 217.595     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 744.732     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 9.96E-08    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 5.47445     | no units                |       |

**Fenpropathrin**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                  |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 366              | USEPA. 2016. Fenpropathrin. Draft Human Health Risk Assessment for Registration Review. EPA-HQ-OPP-2010-0422-0017. DP No. D425768. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                   |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society. |

**Fenthion**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |               |
|-----------------|---------------|
| Name:           | Fenthion      |
| CASRN:          | 55-38-9       |
| DTXSID:         | DTXSID8020620 |
| Use:            | Insecticide   |
| Chemical Notes: |               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 | X |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.48                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 7       | non-cancer effects | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                  | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.4                    | plasma cholinesterase inhibition | general population | OPP               | 2001                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|------|
| 0.19                         |                                               | EEC SW 56-day average (chronic)      | OPP    | 2001 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |
| Not Applicable |                |                |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Fenthion

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value   | Units     | Assessment Source | Critical Study | Critical Effect                  | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|---------|-----------|-------------------|----------------|----------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.00007 | mg/kg/day | OPP 2001          | Rosenblum 1980 | plasma cholinesterase inhibition | general population | 33.8                        | 0.414      | [246]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value         | Units     | Source                                  | Notes |
|---------------------------------------------|---------------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |               |           |                                         |       |
| Acute Human Health Benchmark                | 0.005         | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.0007        | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.0004        | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.0004        | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.00007       | mg/kg/day | EPA HHBP                                |       |
| Cancer Classification (CC)                  | Female.Mice N | no units  | HHS NTP                                 |       |
| Cancer Classification (CC)                  | Female.Rats N | no units  | HHS NTP                                 |       |
| Cancer Classification (CC)                  | Male.Mice E   | no units  | HHS NTP                                 |       |
| Cancer Classification (CC)                  | Male.Rats N   | no units  | HHS NTP                                 |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 150   | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 245   | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 18    | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 0.03  | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 0.056 | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 6     | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 11.56 | percent   | EPA Chemistry Dashboard         |       |
| TD50                                             | 1.03  | mg/kg/day | NIH CPDB                        | min   |
| TD50                                             | 29.4  | mg/kg/day | NIH CPDB                        | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0002965 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.214     | no units | TEST QSAR |       |
| Developmental toxin test | 0.588     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
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EPA - Office of Water

Fenthion  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 336                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 36                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 300                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects                                         | Minimum Conc. (Detects)                                                                                                                                                                                                                                                 | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                                                              |                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 1                             | 0                 | Sites               | 0                                                            |                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 15                            | 0                 | Sites               | 0                                                            |                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                                                              |                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 3                             | 0                 | Sites               | 0                                                            |                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 59                            | 0                 | Sites               | 0                                                            |                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 1                             | 0                 | Sites               | 0                                                            |                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 60                            | 0                 | Sites               | 0                                                            |                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 123                           | 0                 | Sites               | 0                                                            |                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 114                           | 0                 | Sites               | 0                                                            |                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 10                            | 0                 | Sites               | 0                                                            |                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 4,579                         | 0                 | Sites               | 0                                                            |                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                                                              |                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                                                              |                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                                                              |                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | Date        | Source                        | Value             | Units               | Model                                                        | Notes                                                                                                                                                                                                                                                                   |                        |                           |                         |             |       |
| Estimated Environmental Concentration (EEC) in Surface Water, 56-day Average (chronic) | 2001        | OPP                           | 0.19              | ug/L                | GENeric Estimated Environmental Concentration (GENEEC) Model | The estimated environmental concentration provided by the most recent available EPA OPP health assessment was selected as the occurrence value for fenthion. The 56-day concentration in surface water was the only value available as an estimate of chronic exposure. |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 8.99E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|----------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.47178    | days                    |       |
| Boiling point                                                  | OPERA QSAR | 361.38     | degree C                |       |
| Boiling point                                                  | TEST QSAR  |            |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 0.0000182  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.0000659  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0000218  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0000212  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 285.803    | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 130.317    | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.00000106 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 4.07281    | no units                |       |

**Fenthion**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                  |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 246              | USEPA. 2001. Interim Reregistration Eligibility Decision for Fenthion. EPA 738-R-00-013. U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Washington, D.C.                                                                                                                          |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society. |

**Fexofenadine**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                |
|-----------------|--------------------------------|
| Name:           | Fexofenadine                   |
| CASRN:          | 83799-24-0                     |
| DTXSID:         | <a href="#">DTXSID00861411</a> |
| Use:            | Antihistaminic                 |
| Chemical Notes: |                                |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxicants                              |  |
| PubMed Neurotoxicants                             |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.47                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 7       | non-cancer effects | 9          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                     | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 3                      | lowest therapeutic dose: anxiolytic, sedative, muscle-relaxant, anticonvulsant and amnestic effects | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 1.4                          | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



## Fexofenadine

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value  | Units     | Assessment Source  | Critical Study        | Critical Effect                                                                                    | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                 |
|------------------------------------|--------|-----------|--------------------|-----------------------|----------------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.0005 | mg/kg/day | FDA 2018; NIH 2018 | Major Pharmaceuticals | lowest therapeutic dose: anxiolytic, sedative, muscle-relaxant, anticonvulsant and amnesic effects | bottle-fed infants | 151                         | 3.30                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 0.0005 | mg/kg/day | FDA 2018; NIH 2018 | Major Pharmaceuticals | lowest therapeutic dose: anxiolytic, sedative, muscle-relaxant, anticonvulsant and amnesic effects | general population | 33.8                        | 12.0                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                            | Value       | Units | Source              | Notes |
|---------------------------------------------------------|-------------|-------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |       |                     |       |
| Screening level for pharmaceutical - general population | 0.011764706 | mg/L  | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.003333333 | mg/L  | EPA Office of Water |       |

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0019634 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.02      | no units | TEST QSAR |       |
| Developmental toxin test | 0.836     | no units | TEST QSAR |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

## Fexofenadine

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 557                                 | 24                   | Sites                  | 4.31                    | 0.00197                    | 0.0348                    | 1.4                          | 3.89                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 75                                  | 24                   | Sites                  | 32                      | 0.00197                    | 0.0348                    | 1.4                          | 3.89                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 482                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                    |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Glassmeyer et al 2017 (Finished) [86]    | 2007 - 2012 | 25                                  | NA                   | Sites                  | 0                       |                            |                           |                              |                            | ug/L        |       |
| <b>Ambient Water</b>                     |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Glassmeyer et al 2017 (Ambient) [86]     | 2007 - 2012 | 25                                  | NA                   | Sites                  | 8                       |                            | 0.112                     |                              | 0.16309                    | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]       | 2012 - 2014 | 38                                  | 16                   | Sites                  | 42                      | 0.010424                   | 0.576                     | 1.74                         | 2.047397                   | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]  | 2013 - 2015 | 1,106                               | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>              |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Scott et al. 2018 (Wastewater) [161]     | 2011 - 2017 | 21                                  | 20                   | Sites                  | 95                      | 0.015476                   | 1.13                      | 2.79                         | 17.37626                   | ug/L        |       |
| <b>Estimated Concentration in Water</b>  | <b>Date</b> | <b>Source</b>                       | <b>Value</b>         | <b>Units</b>           | <b>Model</b>            | <b>Notes</b>               |                           |                              |                            |             |       |
|                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expcast exposure                                   |      |                                               |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value     | Units                   | Notes |
|-------------------------------------------------------------------|------------|-----------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 26.1502   | days                    |       |
| Boiling point                                                     | OPERA QSAR | 422.926   | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 514.695   | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 2.56E-09  | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 1.45E-11  | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0000028 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0000137 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 13.808    | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 15.9956   | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 2.51E-08  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 4.63629   | no units                |       |

**Fexofenadine**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                  |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. Environmental Science and Technology 53: 2950-2960.                                                   |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. Environmental science & technology, 51(9), 4792-4802.            |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                  |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. Science of The Total Environment. v581-582, (909-922). |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                             |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. Science of the Total Environment, 636, 69-79.        |

## Fipronil

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                        |
|-----------------|----------------------------------------|
| Name:           | Fipronil                               |
| CASRN:          | 120068-37-3                            |
| DTXSID:         | <a href="#">DTXSID4034609</a>          |
| Use:            | insecticide, seed treatment/protectant |
| Chemical Notes: |                                        |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.02                       |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity          | Prevalence | Magnitude |
|---------|-------------------|------------|-----------|
| 9       | reduced longevity | 9          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                 | Target Pop.               | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------|---------------------------|-------------------|----------------------|
| HRL                                                      | 1                      | increased incidence of seizures and death, changes in clinical chemistry (protein), increased TSH, decreased T4 | women of childbearing age | OPP               | 2011                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.02                         | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

## Basis

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Fipronil

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study | Critical Effect                                                                                                     | Target Population         | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|----------------|---------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0002 | mg/kg/day | OPP 2011          | Aughton 1993   | increased incidence of seizures and death, alterations in clinical chemistry (protein), increased TSH, decreased T4 | women of childbearing age | 35.4                        | 1.13       | [319]                    |       |
| Cancer Classification (CC)         | C      |           | OPP 2011          |                |                                                                                                                     |                           |                             |            | [319]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value  | Units     | Source                                  | Notes |
|---------------------------------------------|--------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |        |           |                                         |       |
| Acute Human Health Benchmark                | 0.17   | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.025  | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.001  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.001  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.0002 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 103       | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 91        | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 26.299999 | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 0.059     | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 0.025     | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 4         | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 26.37     | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 0.32      | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 3.2       | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 0.11      | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 1.72      | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value | Units | Source    | Notes |
|--------------------------|-------|-------|-----------|-------|
| <b>Modeled Data</b>      |       |       |           |       |
| LD50                     |       |       | TEST QSAR |       |
| Ames mutagenicity test   |       |       | TEST QSAR |       |
| Developmental toxin test |       |       | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

**Fipronil**  
CCL 5 Contaminant Information Sheet  
**OCCURRENCE DATA**

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**Scoring Data**

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 5,307                         | 402               | Sites              | 7.57                 | 0.00014                 | 0.0063                 | 0.02                      | 6.41                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 634                           | 326               | Sites              | 51                   | 0.00014                 | 0.00619                | 0.019                     | 6.41                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 4,673                         | 76                | Sites              | 1.63                 | 0.00096                 | 0.008                  | 0.0503                    | 0.43                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 12               | 7,124                     | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

**Non-Scoring Data**

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 8                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 1,001                         | 321               | Sites               | 32                   | 0.00022                 | 0.0067                 | 0.035                     | 0.181                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 3,062                         | 46                | Sites               | 1.5                  | 0.001                   | 0.005                  | 0.0168                    | 0.035                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 4,062                         | 367               | Sites               | 9.03                 | 0.00022                 | 0.0065                 | 0.033                     | 0.181                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 121                           | 15                | Sites               | 12                   | 0.00058                 | 0.00058                | 0.00226                   | 0.013                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 114                           | 11                | Sites               | 9.65                 | 0.00058                 | 0.0014                 | 0.00531                   | 0.013                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 8                             | 4                 | Sites               | 50                   | 0.00058                 | 0.00058                | 0.00132                   | 0.0028                  | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 1,135                         | 513               | Sites               | 45                   | 0.00031                 | 0.051                  | 0.203                     | 2.11                    | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 17                | Sites               | 45                   | 0.0066                  | 0.0238                 | 0.0948                    | 0.153                   | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 4                 | Sites               | 0.58                 | 0.001                   | 0.0014                 | 0.00255                   | 0.003                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 1                 | Sites               | 50                   | 0.001                   | 0.001                  | 0.001                     | 0.001                   | ug/L        |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                                     | 2002 - 2010 | 119                           | 5                 | Samples             | 4.2                  |                         |                        |                           | 0.041                   | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 2.65E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|----------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.54048    | days                    |       |
| Boiling point                                                  | OPERA QSAR | 323.014    | degree C                |       |
| Boiling point                                                  | TEST QSAR  |            |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 2.17E-09   | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  |            |                         |       |
| Solubility in water                                            | OPERA QSAR | 0.00000538 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.000065   | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 5.12606    | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  |            |                         |       |
| Henry's Law constant                                           | OPERA QSAR | 9.05E-09   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.93502    | no units                |       |

**Fipronil**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 319              | USEPA. 2011. Fipronil. Human Health Assessment Scoping Document in Support of Registration Review. EPA-HQ-OPP-2011-0448-0004. DP No. D387318. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                           |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

## Fluconazole

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Fluconazole                   |
| CASRN:          | 86386-73-4                    |
| DTXSID:         | <a href="#">DTXSID3020627</a> |
| Use:            | Antifungal                    |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.36                       |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 7       | non-cancer effects | 9          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                                                                        | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 1                      | lowest therapeutic dose: treatment of vaginal candidiasis (vaginal yeast infections due to Candida), oropharyngeal and esophageal candidiasis, cryptococcal meningitis | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.357                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |
| Not Applicable |                |                |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



## Fluconazole

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value       | Units     | Assessment Source  | Critical Study                 | Critical Effect                                                                                                                                                        | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                 |
|------------------------------------|-------------|-----------|--------------------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.000208333 | mg/kg/day | FDA 2018; NIH 2018 | Teva Pharmaceuticals USA, Inc. | lowest therapeutic dose: treatment of vaginal candidiasis (vaginal yeast infections due to Candida), oropharyngeal and esophageal candidiasis, cryptococcal meningitis | bottle-fed infants | 151                         | 1.40                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 0.000208333 | mg/kg/day | FDA 2018; NIH 2018 | Teva Pharmaceuticals USA, Inc. | lowest therapeutic dose: treatment of vaginal candidiasis (vaginal yeast infections due to Candida), oropharyngeal and esophageal candidiasis, cryptococcal meningitis | general population | 33.8                        | 4.90                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      | 2020-01-28         | 5574                                           |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                            | Value       | Units | Source              | Notes |
|---------------------------------------------------------|-------------|-------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |       |                     |       |
| Screening level for pharmaceutical - general population | 0.004901961 | mg/L  | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.001388889 | mg/L  | EPA Office of Water |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| Percent of active toxcast in vitro assays tested | 0.45  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0021727 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.828     | no units | TEST QSAR |       |
| Developmental toxin test |           |          | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
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EPA - Office of Water

Fluconazole  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 557                           | 14                | Sites               | 2.51                 | 0.00139                 | 0.025                  | 0.357                     | 0.482                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 75                            | 12                | Sites               | 16                   | 0.00139                 | 0.025                  | 0.395                     | 0.482                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 482                           | 2                 | Sites               | 0.41                 | 0.00501                 | 0.0895                 | 0.14                      | 0.174                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                    |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Finished) [86]    | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| <b>Ambient Water</b>                     |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Ambient) [86]     | 2007 - 2012 | 25                            | NA                | Sites               | 4                    |                         | 0.0337                 |                           | 0.03367                 | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]       | 2012 - 2014 | 38                            | 14                | Sites               | 37                   | 0.0053864               | 0.108                  | 0.196                     | 0.2324315               | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]  | 2013 - 2015 | 1,106                         | 1                 | Sites               | 0.09                 | 0.0507747               | 0.0508                 | 0.0508                    | 0.0507747               | ug/L        |       |
| <b>Waste Water Effluent</b>              |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]     | 2011 - 2017 | 21                            | 21                | Sites               | 100                  | 0.0700863               | 0.146                  | 0.497                     | 555                     | ug/L        |       |
| <b>Estimated Concentration in Water</b>  | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Exposure exposure                               |      | 0.000000221                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|----------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.46378    | days                    |       |
| Boiling point                                                  | OPERA QSAR | 293.089    | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 408.078    | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 2.39E-09   | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 2.99E-08   | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0101826  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00134586 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 6.95881    | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 20.797     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 7.12E-09   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 0.62128    | no units                |       |

**Fluconazole**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                  |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. Environmental Science and Technology 53: 2950-2960.                                                   |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. Environmental science & technology, 51(9), 4792-4802.            |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                  |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. Science of The Total Environment. v581-582, (909-922). |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                             |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. Science of the Total Environment, 636, 69-79.        |

## Flufenacet

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Flufenacet                    |
| CASRN:          | 142459-58-3                   |
| DTXSID:         | <a href="#">DTXSID2032552</a> |
| Use:            | Preemergent herbicide         |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.11                       |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 6       | reproductive and developmental effects | 8          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                              | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 2                      | decreased pup body weight, delayed eye opening, delayed preputial separation, decreased caudate putamen size | bottle-fed infants | OPP               | 2015                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.228                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Flufenacet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study | Critical Effect                                                                                              | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|----------------|--------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0017 | mg/kg/day | OPP 2015          | Hoberman 2000  | decreased pup body weight, delayed eye opening, delayed preputial separation, decreased caudate putamen size | bottle-fed infants | 151                         | 2.25       | [345]                    |       |
| Cancer Classification (CC)         | NL     |           | OPP 2015          |                |                                                                                                              |                    |                             |            | [345]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value  | Units     | Source                                  | Notes |
|---------------------------------------------|--------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |        |           |                                         |       |
| Acute Human Health Benchmark                | 0.011  | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.0017 | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.011  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.011  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.0017 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 2347      | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 371       | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 1.2       | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 1000      | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 1.29      | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 25        | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 12.4      | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 6         | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 64.199997 | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 1.7       | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 24.5      | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0039995 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.556     | no units | TEST QSAR |       |
| Developmental toxin test | 0.742     | no units | TEST QSAR |       |

## Flufenacet

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 973                                 | 15                   | Sites                 | 1.54                    | 0.02                       | 0.03                      | 0.228                        | 0.44                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 69                                  | 12                   | Sites                 | 17                      | 0.02                       | 0.03                      | 0.252                        | 0.44                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 904                                 | 3                    | Sites                 | 0.33                    | 0.02                       | 0.04                      | 0.047                        | 0.05                       | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 14               | 115,383                      | 2016 | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                               | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|------------------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                                  |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                           | 2001 - 2013 | 4                                   | 1                    | Sites                  | 25                      | 0.075                      | 0.075                     | 0.075                        | 0.075                      | ug/L        |       |
| <b>Ambient Water</b>                                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water)          | 2008 - 2017 | 113                                 | 3                    | Sites                  | 2.65                    | 0.02                       | 0.03                      | 0.065                        | 0.08                       | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)            | 2008 - 2017 | 342                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (All Water)              | 2008 - 2017 | 455                                 | 3                    | Sites                  | 0.66                    | 0.02                       | 0.03                      | 0.065                        | 0.08                       | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated) | 2001 - 2013 | 4                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                          | 2001 - 2013 | 4                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                            |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water                                       | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expocast exposure                                  |      | 0.00000012                                    |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.53831     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 350.468     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 362.085     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.000000773 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.000000151 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000125919 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0000364   | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 10.967      | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 51.9996     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 7.92E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 3.14459     | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                             |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 345              | USEPA. 2015. Flufenacet: Human Health Draft Risk Assessment for Registration Review. EPA-HQ-OPP-2010-0863-0017. DP No. D416546. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C. |

## Fluometuron

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Fluometuron                   |
| CASRN:          | 2164-17-2                     |
| DTXSID:         | <a href="#">DTXSID8020628</a> |
| Use:            | Herbicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.56                       |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 4       | carcinogen with linear MOA | 9          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                  | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 2                      | combined adenomas/carcinomas in the lung of males and malignant lymphocytic lymphomas in females | general population | OPP               | 2016                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 1.116                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |
| Not Applicable |                |                |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



## Fluometuron

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units          | Assessment Source | Critical Study      | Critical Effect                                                                                  | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|----------------|-------------------|---------------------|--------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.005 | mg/kg/day      | OPP 2016          | Burdock et al. 1982 | decreased body weight gain, increased splenic hemosiderin pigment deposition                     | general population | 33.8                        | 29.6       | [367]                    |       |
| Cancer Slope Factor (CSF)          | 0.018 | (mg/kg/day)^-1 | OPP 2016          | Burdock et al. 1982 | combined adenomas/carcinomas in the lung of males and malignant lymphocytic lymphomas in females | general population | 33.8                        | 1.64       | [367]                    |       |
| Cancer Classification (CC)         | C     |                | OPP 2016          |                     |                                                                                                  |                    |                             |            | [367]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value         | Units    | Source         | Notes |
|---------------------------------------------|---------------|----------|----------------|-------|
| <b>Measured Data and Assessment Results</b> |               |          |                |       |
| 10-day Health Advisory                      | 2             | mg/L     | EPA DWSHA 2018 |       |
| Cancer Classification (CC)                  | 3             | no units | WHO IARC       |       |
| Lifetime Health Advisory                    | 0.09          | mg/L     | EPA DWSHA 2018 |       |
| Cancer Classification (CC)                  | Female.Mice N | no units | HHS NTP        |       |
| Cancer Classification (CC)                  | Female.Rats N | no units | HHS NTP        |       |
| Cancer Classification (CC)                  | Male.Mice E   | no units | HHS NTP        |       |
| Cancer Classification (CC)                  | Male.Rats N   | no units | HHS NTP        |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 6416      | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 810       | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 100       | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 260.20001 | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 10        | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 83.9      | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 3.04      | percent   | EPA Chemistry Dashboard         |       |
| TD50                                             | 1420      | mg/kg/day | NIH CPDB                        | max   |
| TD50                                             | 55.4      | mg/kg/day | NIH CPDB                        | min   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0031915 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.047     | no units | TEST QSAR |       |
| Developmental toxin test | 0.851     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
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EPA - Office of Water

Fluometuron

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**OCCURRENCE DATA**

**Scoring Data**

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 7,813                         | 242               | Sites              | 3.1                  | 0.00011                 | 0.07                   | 1.12                      | 31.5                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 1,222                         | 136               | Sites              | 11                   | 0.00011                 | 0.06                   | 1.09                      | 31.5                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 6,591                         | 106               | Sites              | 1.61                 | 0.00035                 | 0.17                   | 1.27                      | 2.26                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 15               | 1,023,468                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

**Non-Scoring Data**

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 3                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 15                            | 6                 | Sites               | 40                   | 0.001998                | 0.007                  | 0.007                     | 0.042                   | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 24                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 495                           | 26                | Sites               | 5.25                 | 0.00424                 | 0.03                   | 0.108                     | 0.79                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 1,249                         | 14                | Sites               | 1.12                 | 0.00938                 | 0.106                  | 0.316                     | 2.71                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 1,744                         | 40                | Sites               | 2.29                 | 0.00424                 | 0.04                   | 0.27                      | 2.71                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 227                           | 14                | Sites               | 6.17                 | 0.001998                | 0.007                  | 0.083                     | 0.229                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 8                 | Sites               | 3.65                 | 0.006993                | 0.083                  | 0.22                      | 0.229                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 10                            | 6                 | Sites               | 60                   | 0.001998                | 0.007                  | 0.007                     | 0.1                     | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 393                           | 1                 | Sites               | 0.25                 | 3                       | 3                      | 3                         | 3                       | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 3                 | Sites               | 7.89                 | 0.0086                  | 0.014                  | 0.0168                    | 0.0175                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 7                 | Sites               | 1.01                 | 3e-04                   | 0.0011                 | 0.0315                    | 0.0514                  | ug/L        |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                                     | 2002 - 2010 | 126                           | 2                 | Samples             | 1.6                  |                         |                        |                           | 0.02                    | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 7.92E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.65653     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 302.918     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 280.864     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00000113  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000000807 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000355964 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.000616595 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 10.1821     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 28.774      | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 8.44E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.43892     | no units                |       |

**Fluometuron**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 367              | USEPA. 2016. Fluometuron. Human Health Assessment Scoping Document in Support of Registration Review. EPA-HQ-OPP-2015-0746-0009. DP No. D430248; D391415. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                               |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

## Fluoranthene

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                                                           |
|-----------------|---------------------------------------------------------------------------|
| Name:           | Fluoranthene                                                              |
| CASRN:          | 206-44-0                                                                  |
| DTXSID:         | <a href="#">DTXSID3024104</a>                                             |
| Use:            | Polycyclic aromatic hydrocarbon; occurs as a result of incomplete burning |
| Chemical Notes: |                                                                           |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             |   |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.00028                    |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 9          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                       | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 200                    | nephropathy, increased liver weights, hematological alterations, and clinical effects | general population | IRIS              | 1990                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.056                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Fluoranthene

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study | Critical Effect                                                                       | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|----------------|---------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.04   | mg/kg/day | IRIS 1990         | USEPA 1988     | nephropathy, increased liver weights, hematological alterations, and clinical effects | general population | 33.8                        | 237        | [207]                    |       |
| Reference Dose (RfD) or Equivalent | 0.0125 | mg/kg/day | WHO 2003          | USEPA 1988     | nephropathy, increased liver weights, hematological alterations, and clinical effects | general population | 33.8                        | 74.0       | [438]                    |       |
| Cancer Classification (CC)         | I      |           | PPRTV 2012        |                |                                                                                       |                    |                             |            | [327]                    |       |
| Cancer Classification (CC)         | D      |           | IRIS 1990         |                |                                                                                       |                    |                             |            | [207]                    |       |
|                                    |        |           | ATSDR 1995        |                |                                                                                       |                    |                             |            | [10]                     |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     | 2011-12-01           | 2020-03-13         | 818                                            | 0                                               | 7                                              |                                                   |

## Other Health Data

| Data Element                                      | Value | Units     | Source                            | Notes |
|---------------------------------------------------|-------|-----------|-----------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |       |           |                                   |       |
| Cancer Classification (CC)                        | 3     | no units  | WHO IARC                          |       |
| Chronic Health-Based Guidance Value               | 0.3   | mg/L      | MN DOH                            |       |
| Chronic Health-Based Guidance Value               | 0.07  | mg/L      | MN DOH                            |       |
| Human Health Ambient Water Quality Criteria       | 0.02  | mg/L      | EPA Human Health Criteria for CWA |       |
| Intermediate Minimal Risk Level (MRL)             | 0.4   | mg/kg/day | CDC ATSDR                         |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.1   | mg/L      | MN DOH                            |       |
| Subchronic Provisional RfD                        | 0.1   | mg/kg/day | EPA PPRTV                         |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 2000  | mg/kg   | NIH HSDB                |       |
| Percent of active toxcast in vitro assays tested | 10.62 | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0049091 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.836     | no units | TEST QSAR |       |
| Developmental toxin test | 0.74      | no units | TEST QSAR |       |

## Fluoranthene

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 589                                 | 42                   | Sites                 | 7.13                    | 0.003                      | 0.01                      | 0.056                        | 0.15                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 101                                 | 34                   | Sites                 | 34                      | 0.003                      | 0.0105                    | 0.064                        | 0.15                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 488                                 | 8                    | Sites                 | 1.64                    | 0.005                      | 0.01                      | 0.0323                       | 0.044                      | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) | 500K - 1M                    |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 20                                  | 1                    | Sites                  | 5                       | 0.002                      | 0.002                     | 0.002                        | 0.002                      | ug/L        |       |
| Drinking Water Monitoring Data - WA (Finished)                | 2006 - 2011 | 481                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                                  | NA                   | Sites                  | 0                       |                            |                           |                              |                            | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 90                                  | 1                    | Sites                  | 1.11                    | 0.034                      | 0.034                     | 0.034                        | 0.034                      | ug/L        |       |
| Drinking Water Monitoring Data - WA (Source)                  | 2006 - 2011 | 634                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 865                                 | 283                  | Sites                  | 33                      | 0.002                      | 0.03                      | 0.425                        | 25.6                       | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 1,096                               | 62                   | Sites                  | 5.66                    | 0.003                      | 0.02                      | 0.195                        | 6                          | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,961                               | 345                  | Sites                  | 18                      | 0.002                      | 0.03                      | 0.41                         | 25.6                       | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                                  | NA                   | Sites                  | 0                       |                            |                           |                              |                            | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                                  | 15                   | Sites                  | 39                      | 0.0045                     | 0.0122                    | 0.0339                       | 0.0564                     | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                                  | 5                    | Sites                  | 24                      |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water                              | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Exposure exposure                                  |      | 0.000000955                                   |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 162.696     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 392.038     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 378.496     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.00000386  | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.000000371 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000000668 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000000318 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 2457.49     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 480.839     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.0000109   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 5.17848     | no units                |       |

**Fluoranthene**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                          |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10               | ATSDR. 1995. Toxicological Profile for Polycyclic Aromatic Hydrocarbons. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                    |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.        |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922). |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                      |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.        |
| 207              | USEPA. 1990. Chemical Assessment Summary, Fluoranthene. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, D.C.                                                                                                 |
| 327              | USEPA. 2012. Provisional Peer-Reviewed Toxicity Values for Fluoranthene. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH.                                        |
| 438              | WHO. 2003. Guidelines for Drinking Water Quality: Polynuclear Aromatic Hydrocarbons (PAHs). World Health Organization (WHO), Geneva, Switzerland.                                                                                                                                                       |

**Fluoxetine**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Fluoxetine                    |
| CASRN:          | 54910-89-3                    |
| DTXSID:         | <a href="#">DTXSID7023067</a> |
| Use:            | antidepressant                |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 | X |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.024                      |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 7       | non-cancer effects | 5          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                    | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 0.6                    | lowest therapeutic dose: treatment of major depressive disorder/bulimia nervosa/OCD/Panic disorder | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.014322                     | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
| X                 |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



## Fluoxetine

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value       | Units     | Assessment Source  | Critical Study                                                    | Critical Effect                                                                                    | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                 |
|------------------------------------|-------------|-----------|--------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 8.33333E-05 | mg/kg/day | FDA 2018; NIH 2018 | McKesson Packaging Services Business Unit of McKesson Corporation | lowest therapeutic dose: treatment of major depressive disorder/bulimia nervosa/OCD/Panic disorder | bottle-fed infants | 151                         | 0.560                      | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 8.33333E-05 | mg/kg/day | FDA 2018; NIH 2018 | McKesson Packaging Services Business Unit of McKesson Corporation | lowest therapeutic dose: treatment of major depressive disorder/bulimia nervosa/OCD/Panic disorder | general population | 33.8                        | 2.00                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                            | Value       | Units     | Source              | Notes |
|---------------------------------------------------------|-------------|-----------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |           |                     |       |
| Maximum Recommended Daily Dose                          | 1.33        | mg/kg/day | FDA                 |       |
| Screening level for pharmaceutical - general population | 0.001960784 | mg/L      | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.000555556 | mg/L      | EPA Office of Water |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| Percent of active toxcast in vitro assays tested | 34.04 | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0034514 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.158     | no units | TEST QSAR |       |
| Developmental toxin test | 0.795     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Fluoxetine  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 557                           | 3                 | Sites              | 0.54                 | 0.00585                 | 0.00784                | 0.0143                    | 0.0171                  | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 75                            | 2                 | Sites              | 2.67                 | 0.00585                 | 0.00684                | 0.00744                   | 0.00784                 | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 482                           | 1                 | Sites              | 0.21                 | 0.0171                  | 0.0171                 | 0.0171                    | 0.0171                  | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                            | Date         | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------------|--------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                               |              |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Furlong et al 2017 (Finished) [83]                                  | 2007 - 2012  | NA                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Glassmeyer et al 2017 (Finished) [86]                               | 2007 - 2012  | 9                             | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Padhye et al. 2013 (Finished) [155]                                 | 2009 - 2010  | 8                             | 1                 | Samples             | 12                   | 0                       | 0                      |                           | 1.92e-05 +/- 7e-07      | ug/L        |       |
| IL EPA (2008) via Uslu et al. (2013) (Finished) [433]               | 2008         | NA                            | NA                |                     |                      |                         |                        |                           | 0.001                   | ug/L        |       |
| <b>Ambient Water</b>                                                |              |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)       | 2008 - 2017  | 206                           | 4                 | Sites               | 1.94                 | 0.002                   | 0.0522                 | 0.0896                    | 0.169                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)         | 2008 - 2017  | 401                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)           | 2008 - 2017  | 607                           | 4                 | Sites               | 0.66                 | 0.002                   | 0.0522                 | 0.0896                    | 0.169                   | ug/L        |       |
| Furlong et al 2017 (Ambient) [83]                                   | 2007 - 2012  | NA                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                                | 2007 - 2012  | 9                             | NA                | Sites               | 11                   |                         | 0.00053                |                           | 0.00053                 | ug/L        |       |
| Batt et al. 2016 (Ambient) [46]                                     | 2008 - 2009  | 182                           | 10                | Sites               | 5.49                 | 9e-04                   | 0.00465                | 0.0133                    | 0.0248                  | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                  | 2012 - 2014  | 38                            | 3                 | Sites               | 7.89                 | 0.0065174               | 0.0136                 | 0.0224                    | 0.0246002               | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                             | 2013 - 2015  | 1,106                         | 1                 | Sites               | 0.09                 | 0.0170815               | 0.0171                 | 0.0171                    | 0.0170815               | ug/L        |       |
| Padhye et al. 2013 (Ambient) [155]                                  | 2009 - 2010  | 8                             | 3                 | Samples             | 38                   | 0                       | 0                      |                           | 9e-07 +/- 1e-07         | ug/L        |       |
| Rahman et al. (2010) via Uslu et al. (2013) (Ambient) [433]         | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.0475                  | ug/L        |       |
| IL EPA (2008) via Uslu et al. (2013) (Ambient) [433]                | 2008         | NA                            | NA                |                     |                      |                         |                        |                           | 0.002                   | ug/L        |       |
| Barnes et al. (2008) via Kostich et al. 2010 (Ambient) [127]        | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.056                   | ug/L        |       |
| Benotti et al. (2009) via Kostich et al. 2010 (Ambient) [127]       | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.0033                  | ug/L        |       |
| Conley et al. (2008) via Kostich et al. 2010 (Ambient) [127]        | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.01                    | ug/L        |       |
| Kolpin et al. (2002) via Kostich et al. 2010 (Ambient) [127]        | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.012                   | ug/L        |       |
| Vanderford et al. (2003) via Kostich et al. 2010 (Ambient) [127]    | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.0055                  | ug/L        |       |
| Vanderford et al. (2006) via Kostich et al. 2010 (Ambient) [127]    | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.0026                  | ug/L        |       |
| <b>Waste Water Effluent</b>                                         |              |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                                | 2011 - 2017  | 21                            | 13                | Sites               | 62                   | 0.0025456               | 0.01                   | 0.0333                    | 0.0432505               | ug/L        |       |
| Kostich et al. 2014 (Wastewater) [126]                              | not reported | 48                            | 18                | Sites               | 38                   | 0.0032                  | 0.0199                 | 0.0272                    | 0.0312                  | ug/L        |       |
| Batt et al. (2008) via Kostich et al. 2010 (Wastewater) [127]       | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.073                   | ug/L        |       |
| Glassmeyer et al. (2005) via Kostich et al. 2010 (Wastewater) [127] | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.021                   | ug/L        |       |
| Shultz et al. (2008) via Kostich et al. 2010 (Wastewater) [127]     | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.07                    | ug/L        |       |
| Vanderford et al. (2006) via Kostich et al. 2010 (Wastewater) [127] | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.025                   | ug/L        |       |

| Estimated Concentration in Water | Date | Source | Value | Units | Model | Notes |
|----------------------------------|------|--------|-------|-------|-------|-------|
|                                  |      |        |       |       |       |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard)  | Date                                | Total Predicted Exposure<br>(mg/kg-bw/day) | Notes        |
|-----------------------------------------------------|-------------------------------------|--------------------------------------------|--------------|
| Expcast exposure                                    |                                     | 3.67E-08                                   |              |
| <b>Biomonitoring Data</b>                           | <b>Detection at 90th Percentile</b> | <b>Units</b>                               | <b>Notes</b> |
| NHANES biomonitoring detection in serum (1999-2016) |                                     |                                            |              |
| NHANES biomonitoring detection in blood (1999-2016) |                                     |                                            |              |
| NHANES biomonitoring detection in urine (1999-2016) |                                     |                                            |              |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.54542     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 316.438     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 343.305     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.000000398 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.00000143  | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0000392   | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0000237   | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 125.272     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 171.791     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.000000144 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 4.13029     | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                  |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 46               | Batt, A. L., Kincaid, T. M., Kostich, M. S., Lazorchak, J. M., & Olsen, A. R. (2016). Evaluating the extent of pharmaceuticals in surface waters of the United States using a National-scale Rivers and Streams Assessment survey. <i>Environmental toxicology and chemistry</i> , 35(4), 874-881.              |
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. <i>Environmental Science and Technology</i> 53: 2950-2960.                                                            |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                                  |
| 83               | Furlong, E.T., Batt, A.L., Glassmeyer, S.T., Noriega, M.C., Kolpin, D.W., Mash, H., Schenck, K.M. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States: Pharmaceuticals. <i>Science of The Total Environment</i> . 579 (1629-1642). |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922).         |
| 126              | Kostich MS, et al. 2014 Concentrations of prioritized pharmaceuticals in effluents from 50 large wastewater treatment plants in the US and implications for risk estimation. <i>Environ Pollut</i> . 2014 Jan;184:354-9. doi: 10.1016/j.envpol.2013.09.013. Epub 2013 Oct 3. PMID: 24095705.                    |
| 127              | Kostich, MS, et al., 2010. Predicting variability of aquatic concentrations of human pharmaceuticals. <i>Sci. Total Environ</i> . 408 (20), 4504e4510.                                                                                                                                                          |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                                             |
| 155              | Padhye, L.P., Yao, H., Kung'u, F.T., and Huang, C.H. Year-long evaluation on the occurrence and fate of pharmaceuticals, personal care products, and endocrine disrupting chemicals in an urban drinking water treatment plant. 2014. <i>Water Research</i> 51 (2014) 266-276.                                  |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                |
| 433              | Uslu, M., Jasim, S., Arvai, A., Bewtra, J. and Biswas, N., 2013. A Survey of Occurrence and Risk Assessment of Pharmaceutical Substances in the Great Lakes Basin. <i>Ozone: Science &amp; Engineering</i> , 35(4), pp.249-262.                                                                                 |

**Galaxolide**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                     |
|-----------------|---------------------------------------------------------------------|
| Name:           | Galaxolide                                                          |
| CASRN:          | 1222-05-5                                                           |
| DTXSID:         | <a href="#">DTXSID8027373</a>                                       |
| Use:            | Fragrance ingredient in perfumes, soaps, cosmetics, and detergents. |
| Chemical Notes: |                                                                     |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxicants                              |  |
| PubMed Neurotoxicants                             |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.000009                   |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 3       | no adverse effects | 9          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 20000                  | no adverse effects seen at highest dose tested | general population | ECHA              | 2011                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.18                         | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**Galaxolide**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element                       | Value | Units     | Assessment Source | Critical Study    | Critical Effect                               | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                    |
|------------------------------------|-------|-----------|-------------------|-------------------|-----------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|--------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 3.8   | mg/kg/day | ECHA 2011         | Api and Ford 1999 | no adverse effects at the highest dose tested | general population | 33.8                        | 22500                      | [71]                     | NOTE: An ECHA Derived No Effect Level (DNEL) is used in place of the RfD |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Hepatic                     | 5                           | Api, 1999          | Respiratory, Reproductive,   | 150                          | Api, 1999           |                      | 2020-04-06         | 385                                            | 2                                               | 0                                              | 2                                                 |

**Other Health Data**

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 4640  | mg/kg   | NIH HSDB                |       |
| Percent of active toxcast in vitro assays tested | 25    | percent | EPA Chemistry Dashboard |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0032063 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | -0.048    | no units | TEST QSAR |       |
| Developmental toxin test | 0.709     | no units | TEST QSAR |       |

## Galaxolide

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                                |             | Prevalence                          |                      |                       |                         | Magnitude                  |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                                |             | Prevalence                          |                      |                       |                         | Magnitude                  |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 570                                 | 52                   | Sites                 | 9.12                    | 0.007                      | 0.057                     | 0.18                         | 2.4                        | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 87                                  | 40                   | Sites                 | 46                      | 0.007                      | 0.065                     | 0.2                          | 2.4                        | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 483                                 | 12                   | Sites                 | 2.48                    | 0.008                      | 0.017                     | 0.0484                       | 0.081                      | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) | 1M - 10M                     |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             | Prevalence                          |                      |                        |                         | Magnitude                  |                           |                              |                            |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                                  | NA                   | Sites                  | 24                      |                            | 0.0365                    |                              | 0.061                      | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             | Prevalence                          |                      |                        |                         | Magnitude                  |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 717                                 | 279                  | Sites                  | 39                      | 0.005                      | 0.04                      | 0.23                         | 4.6                        | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 692                                 | 38                   | Sites                  | 5.49                    | 0.004                      | 0.0375                    | 0.942                        | 1.72                       | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,409                               | 317                  | Sites                  | 22                      | 0.004                      | 0.04                      | 0.256                        | 4.6                        | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                                  | NA                   | Sites                  | 36                      |                            | 0.028                     |                              | 0.11                       | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                                  | 20                   | Sites                  | 53                      | 0.0076                     | 0.285                     | 1.03                         | 1.4                        | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                                   | 1                    | Sites                  | 50                      |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             | Prevalence                          |                      |                        |                         | Magnitude                  |                           |                              |                            |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                                  | 21                   | Sites                  | 100                     | 0.49                       | 1.2                       | 2                            | 4.6                        | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Exposure exposure                                  |      |                                               |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 28.8833     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 323.86      | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 312.099     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.000374131 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.000385478 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.00000606  | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000015    | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 788.097     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 1667.25     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.0000223   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 5.75078     | no units                |       |

**Galaxolide**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                               |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                             |
| 71               | ECHA. 2011. Registration Dossier: 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylindeno[5,6-c]pyran. European Chemicals Agency (ECHA), Helsinki, Finland. <a href="https://echa.europa.eu/registration-dossier/-/registered-dossier/14504/1">https://echa.europa.eu/registration-dossier/-/registered-dossier/14504/1</a> . Accessed 03/03/2020 |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922).                                      |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                           |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                                             |

**Gemfibrozil**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Gemfibrozil                   |
| CASRN:          | 25812-30-0                    |
| DTXSID:         | <a href="#">DTXSID0020652</a> |
| Use:            | antihyperlipoproteinemic      |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.0022                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects |            |           |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                       | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 30                     | lowest therapeutic dose: lipid regulation (decreases VLDL, increases HDL cholesterol) | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source      | Date |
|------------------------------|-----------------------------------------------|--------------------------------------|-------------|------|
| 0.06654                      | 90th Percentile                               | Ambient Water                        | Batt et al. | 2016 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
| X                 |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.



## Gemfibrozil

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value | Units     | Assessment Source  | Critical Study            | Critical Effect                                                                       | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                 |
|------------------------------------|-------|-----------|--------------------|---------------------------|---------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.005 | mg/kg/day | FDA 2018; NIH 2018 | Watson Laboratories, Inc. | lowest therapeutic dose: lipid regulation (decreases VLDL, increases HDL cholesterol) | bottle-fed infants | 151                         | 33.0                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 0.005 | mg/kg/day | FDA 2018; NIH 2018 | Watson Laboratories, Inc. | lowest therapeutic dose: lipid regulation (decreases VLDL, increases HDL cholesterol) | general population | 33.8                        | 120                        | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                            | Value       | Units     | Source              | Notes |
|---------------------------------------------------------|-------------|-----------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |           |                     |       |
| Cancer Classification (CC)                              | 3           | no units  | WHO IARC            |       |
| Maximum Recommended Daily Dose                          | 20          | mg/kg/day | FDA                 |       |
| Screening level for pharmaceutical - general population | 0.117647059 | mg/L      | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.033333333 | mg/L      | EPA Office of Water |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 316   | mg/kg   | NIH HSDB                | min   |
| LD50                                             | 479   | mg/kg   | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 2.56  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value    | Units    | Source    | Notes |
|--------------------------|----------|----------|-----------|-------|
| <b>Modeled Data</b>      |          |          |           |       |
| LD50                     | 0.001875 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.229    | no units | TEST QSAR |       |
| Developmental toxin test | 0.849    | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Gemfibrozil

CCL 5 Contaminant Information Sheet

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**OCCURRENCE DATA**

**Scoring Data**

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

**Non-Scoring Data**

| Non-Nationally Representative Water Data                         | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                   | 2006 - 2020 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Finished) [86]                            | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Kleywegt et al. (2011) via Uslu et al. (2013) (Finished) [433]   | 2011        | NA                            | NA                |                     |                      |                         |                        |                           | 0.004                   | ug/L        |       |
| Tabe et al. (2009) via Uslu et al. (2013) (Finished) [433]       | 2009        | NA                            | NA                |                     |                      |                         |                        |                           | 0.002                   | ug/L        |       |
| Kormos et al. (2007) via Uslu et al. (2013) (Finished) [433]     | 2007        | NA                            | NA                |                     |                      |                         |                        |                           | 0.003                   | ug/L        |       |
| IL EPA (2008) via Uslu et al. (2013) (Finished) [433]            | 2008        | NA                            | NA                |                     |                      |                         |                        |                           | 0.0106                  | ug/L        |       |
| <b>Ambient Water</b>                                             |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                     | 2006 - 2020 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Ambient) [86]                             | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Batt et al. 2016 (Ambient) [46]                                  | 2008 - 2009 | 182                           | 27                | Sites               | 15                   | 0.0051                  | 0.0225                 | 0.0665                    | 0.1125                  | ug/L        |       |
| Kleywegt et al. (2011) via Uslu et al. (2013) (Ambient) [433]    | 2011        | NA                            | NA                |                     |                      |                         |                        |                           | 0.009                   | ug/L        |       |
| Tabe et al. (2009) via Uslu et al. (2013) (Ambient) [433]        | 2009        | NA                            | NA                |                     |                      |                         |                        |                           | 0.004                   | ug/L        |       |
| Kormos et al. (2007) via Uslu et al. (2013) (Ambient) [433]      | 2007        | NA                            | NA                |                     |                      |                         |                        |                           | 0.006                   | ug/L        |       |
| IL EPA (2008) via Uslu et al. (2013) (Ambient) [433]             | 2008        | NA                            | NA                |                     |                      |                         |                        |                           | 0.0174                  | ug/L        |       |
| Benotti et al. (2009) via Kostich et al. 2010 (Ambient) [127]    | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.024                   | ug/L        |       |
| Conkle et al. (2008) via Kostich et al. 2010 (Ambient) [127]     | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.081                   | ug/L        |       |
| Fono et al. (2006) via Kostich et al. 2010 (Ambient) [127]       | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.079                   | ug/L        |       |
| Gross et al. (2004) via Kostich et al. 2010 (Ambient) [127]      | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.18                    | ug/L        |       |
| Kolpin et al. (2002) via Kostich et al. 2010 (Ambient) [127]     | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.79                    | ug/L        |       |
| Lin et al. (2006) via Kostich et al. 2010 (Ambient) [127]        | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.065                   | ug/L        |       |
| Spongberg et al. (2008) via Kostich et al. 2010 (Ambient) [127]  | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.006                   | ug/L        |       |
| Trenholm et al. (2006) via Kostich et al. 2010 (Ambient) [127]   | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.0048                  | ug/L        |       |
| Vanderford et al. (2003) via Kostich et al. 2010 (Ambient) [127] | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.056                   | ug/L        |       |
| Vanderford et al. (2006) via Kostich et al. 2010 (Ambient) [127] | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.17                    | ug/L        |       |

| Non-Nationally Representative Water Data                            | Date         | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------------|--------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Waste Water Effluent</b>                                         |              |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                     |              | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Kostich et al. 2014 (Wastewater) [126]                              | not reported | 50                            | 38                | Sites               | 76                   | 0.0908                  | 0.506                  | 1.4                       | 2.3396                  | ug/L        |       |
| Batt et al. (2008) via Kostich et al. 2010 (Wastewater) [127]       | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 1.22                    | ug/L        |       |
| Conkle et al. (2008) via Kostich et al. 2010 (Wastewater) [127]     | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 1.819                   | ug/L        |       |
| Drewes et al. (2002) via Kostich et al. 2010 (Wastewater) [127]     | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 1.235                   | ug/L        |       |
| Fono et al. (2006) via Kostich et al. 2010 (Wastewater) [127]       | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.234                   | ug/L        |       |
| Gross et al. (2004) via Kostich et al. 2010 (Wastewater) [127]      | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.158                   | ug/L        |       |
| Soliman et al. (2007) via Kostich et al. 2010 (Wastewater) [127]    | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.5                     | ug/L        |       |
| Spongberg et al. (2008) via Kostich et al. 2010 (Wastewater) [127]  | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.451                   | ug/L        |       |
| Trenholm et al. (2006) via Kostich et al. 2010 (Wastewater) [127]   | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 1.22                    | ug/L        |       |
| Vanderford et al. (2006) via Kostich et al. 2010 (Wastewater) [127] | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 4.77                    | ug/L        |       |
| Yu et al. (2006) via Kostich et al. 2010 (Wastewater) [127]         | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.41                    | ug/L        |       |
|                                                                     |              |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                             | <b>Date</b>  | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                     |              |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                                  |      | 0.000000193                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.52148     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 326.707     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 349.352     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.00000936  | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.00000172  | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000247743 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.00000685  | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 3.16534     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 16.1065     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 8.62E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 4.42964     | no units                |       |

**Gemfibrozil**

CCL 5 Contaminant Information Sheet

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| 46  | Batt, A. L., Kincaid, T. M., Kostich, M. S., Lazorchak, J. M., & Olsen, A. R. (2016). Evaluating the extent of pharmaceuticals in surface waters of the United States using a National-scale Rivers and Streams Assessment survey. <i>Environmental toxicology and chemistry</i> , 35(4), 874-881.      |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 77  | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                          |
| 86  | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922). |
| 126 | Kostich MS, et al. 2014 Concentrations of prioritized pharmaceuticals in effluents from 50 large wastewater treatment plants in the US and implications for risk estimation. <i>Environ Pollut</i> . 2014 Jan;184:354-9. doi: 10.1016/j.envpol.2013.09.013. Epub 2013 Oct 3. PMID: 24095705.            |
| 127 | Kostich, MS, et al., 2010. Predicting variability of aquatic concentrations of human pharmaceuticals. <i>Sci. Total Environ</i> . 408 (20), 4504e4510.                                                                                                                                                  |
| 150 | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                                     |
| 433 | Uslu, M., Jasim, S., Arvai, A., Bewtra, J. and Biswas, N., 2013. A Survey of Occurrence and Risk Assessment of Pharmaceutical Substances in the Great Lakes Basin. <i>Ozone: Science &amp; Engineering</i> , 35(4), pp.249-262.                                                                         |

## Halon 1011 (bromochloromethane)

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                                 |
|-----------------|-------------------------------------------------|
| Name:           | Halon 1011 (bromochloromethane)                 |
| CASRN:          | 74-97-5                                         |
| DTXSID:         | <a href="#">DTXSID4021503</a>                   |
| Use:            | Fire extinguishing fluid; chemical intermediate |
| Chemical Notes: |                                                 |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxicants                              |  |
| PubMed Neurotoxicants                             |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

## CONTAMINANT SUMMARY &amp; DECISION

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 |                            |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity | Prevalence | Magnitude |
|---------|----------|------------|-----------|
|         |          | 9          | 5         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect | Target Pop. | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------|-------------|-------------------|----------------------|
|                                                          |                        |                 |             |                   |                      |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.3954                       | 90th Percentile                               | Finished Water                       | UCMR3  | 2013-2015 |

## PUBLIC NOMINATION STATUS

|                   |
|-------------------|
| Public Nomination |
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

## Basis

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

Halon 1011 (bromochloromethane)  
CCL 5 Contaminant Information Sheet  
HEALTH EFFECTS DATA

EPA-OGWDW and OST

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## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study         | Critical Effect                     | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                             |
|------------------------------------|-------|-----------|-------------------|------------------------|-------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.013 | mg/kg/day | OW 1989           | Torkelson et al., 1960 | increased liver to bodyweight ratio | general population | 33.8                        | 76.9       | [202]                    |                                                                   |
| Cancer Classification (CC)         | D     |           | OW 1989           |                        |                                     |                    |                             |            | [202]                    |                                                                   |
| Cancer Classification (CC)         | D     |           | IRIS 1991         |                        |                                     |                    |                             |            | [210]                    |                                                                   |
| Cancer Classification (CC)         | I     |           | PPRTV 2009        |                        |                                     |                    |                             |            | [302]                    | Note: No toxicity values have been derived for bromochloromethane |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     | 2008-09-01           | 2020-04-14         | 6                                              | 0                                               | 0                                              |                                                   |

## Other Health Data

| Data Element                                | Value | Units             | Source         | Notes |
|---------------------------------------------|-------|-------------------|----------------|-------|
| <b>Measured Data and Assessment Results</b> |       |                   |                |       |
| 10-day Health Advisory                      | 1     | mg/L              | EPA DWSHA 2018 |       |
| Lifetime Health Advisory                    | 0.09  | mg/L              | EPA DWSHA 2018 |       |
| Subchronic RfC                              | 0.1   | mg/m <sup>3</sup> | EPA PPRTV      |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 4300  | mg/kg   | NIH HSDB                | min   |
| LD50                                             | 5000  | mg/kg   | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 0.85  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0023878 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.69      | no units | TEST QSAR |       |
| Developmental toxin test |           |          | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Halon 1011 (bromochloromethane)  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 | 4,916                         | 309               | Sites               | 6.29                 | 0.06                    | 0.11                   | 0.395                     | 5.17                    | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 | 22,974                        | 106               | Sites               | 0.46                 | 0.0023                  | 1                      | 6                         | 33.4                    | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 | 12,881                        | 65                | Sites               | 0.5                  | 0.05                    | 1                      | 10                        | 210                     | ug/L        |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 7,734                         | 19                | Sites               | 0.25                 | 0.01                    | 0.14                   | 0.445                     | 1.15                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 264                           | 4                 | Sites               | 1.52                 | 0.01                    | 0.38                   | 0.441                     | 0.45                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 7,470                         | 15                | Sites               | 0.2                  | 0.02                    | 0.075                  | 0.384                     | 1.15                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 401                           | 11                | Sites               | 2.74                 | 0.5                     | 0.805                  | 3.65                      | 6                       | ug/L        |       |
| Drinking Water Monitoring Data - MA (Finished)                | 2006 - 2020 | 888                           | 29                | Sites               | 3.27                 | 0.5                     | 2.4                    | 6.26                      | 18                      | ug/L        |       |
| Drinking Water Monitoring Data - WA (Finished)                | 2006 - 2011 | 1,188                         | 1                 | Sites               | 0.08                 | 0.66                    | 0.66                   | 0.66                      | 0.66                    | ug/L        |       |
| Bradley et al. 2018 (Finished) [53]                           | 2016        | 26                            | 1                 | Sites               | 3.85                 | 0.07637                 | 0.0764                 | 0.0764                    | 0.07637                 | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 4,242                         | 23                | Sites               | 0.54                 | 0.4                     | 1.15                   | 3                         | 8.9                     | ug/L        |       |
| Drinking Water Monitoring Data - MA (Source)                  | 2006 - 2020 | 130                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - PA (Source)                  | 2006 - 2011 | 13                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WA (Source)                  | 2006 - 2011 | 1,665                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WI (Source)                  | 2012-2019   | 33                            | 1                 | Sites               | 3.03                 | 0.61                    | 0.61                   | 0.61                      | 0.61                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 169                           | 9                 | Sites               | 5.33                 | 0.01                    | 0.04                   | 0.06                      | 0.06                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 3,487                         | 8                 | Sites               | 0.23                 | 0.02                    | 0.035                  | 0.09                      | 0.17                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 3,653                         | 17                | Sites               | 0.47                 | 0.01                    | 0.04                   | 0.07                      | 0.17                    | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                            | 5                 | Sites               | 13                   | 0.02169                 | 0.0357                 | 0.0554                    | 0.05931                 | ug/L        |       |
| Arnold et al. 2016 (Unfiltered) [7]                           | 2012 - 2013 | 685                           | 1                 | Sites               | 0.15                 | 0.03                    | 0.03                   | 0.03                      | 0.03                    | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                              | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 4.55E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value     | Units                   | Notes |
|----------------------------------------------------------------|------------|-----------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 14.1519   | days                    |       |
| Boiling point                                                  | OPERA QSAR | 64.2952   | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 66.832    | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 181.807   | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 231.206   | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0723047 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0625173 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 5.65089   | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 4.40555   | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.0038283 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 1.45955   | no units                |       |

**Halon 1011 (bromochloromethane)**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985.                                                                    |
| 202              | USEPA. 1989. Bromochloromethane Health Advisory. U.S. Environmental Protection Agency, Office of Water, Washington, D.C.                                                                                                                                                                                                                                                                                                           |
| 210              | USEPA. 1991. Chemical Assessment Summary, Bromochloromethane. U.S. Environmental Protection Agency, National Center for Environmental Protection, Integrated Risk Information System (IRIS), Washington, D.C.                                                                                                                                                                                                                      |
| 302              | USEPA. 2009. Provisional Peer-Reviewed Toxicity Values for Bromochloromethane. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH.                                                                                                                                                             |



## HCFC-22

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                                                                                         |
|-----------------|---------------------------------------------------------------------------------------------------------|
| Name:           | HCFC-22                                                                                                 |
| CASRN:          | 75-45-6                                                                                                 |
| DTXSID:         | <a href="#">DTXSID6020301</a>                                                                           |
| Use:            | Refrigerant; low-temperature solvent; fluorocarbon resins, especially tetrafluoroethylene polymers; gas |
| Chemical Notes: |                                                                                                         |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 |                            |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity | Prevalence | Magnitude |
|---------|----------|------------|-----------|
|         |          | 9          | 5         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect | Target Pop. | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------|-------------|-------------------|----------------------|
|                                                          |                        |                 |             |                   |                      |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 1.2                          | 90th Percentile                               | Finished Water                       | UCMR3  | 2013-2015 |

## PUBLIC NOMINATION STATUS

|                   |
|-------------------|
| Public Nomination |
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## HCFC-22

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                                                                                  |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
|              |       |       | IRIS 1993         |                |                 |                   |                             |            | [221]                    | NOTE: HCFC-22 is highly volatile. No oral toxicity values were derived. No PECO-relevant studies were found in the rapid systematic literature review. |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     | 2002-08-01           | 2020-03-25         | 130                                            | 0                                               | 2                                              |                                                   |

## Other Health Data

| Data Element                                | Value | Units             | Source   | Notes |
|---------------------------------------------|-------|-------------------|----------|-------|
| <b>Measured Data and Assessment Results</b> |       |                   |          |       |
| Cancer Classification (CC)                  | 3     | no units          | WHO IARC |       |
| Reference Concentration (RfC)               | 50    | mg/m <sup>3</sup> | EPA IRIS |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

| Data Element             | Value | Units    | Source    | Notes |
|--------------------------|-------|----------|-----------|-------|
| <b>Modeled Data</b>      |       |          |           |       |
| LD50                     |       |          | TEST QSAR |       |
| Ames mutagenicity test   | 0.574 | no units | TEST QSAR |       |
| Developmental toxin test | 0.57  | no units | TEST QSAR |       |

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                                |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 | 4,916                               | 286                  | Sites                 | 5.82                    | 0.08                       | 0.22                      | 1.2                          | 250                        | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                                |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,411                               | 55                   | Sites                 | 3.9                     | 0.02                       | 0.08                      | 0.895                        | 15.6                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 51                                  | 3                    | Sites                 | 5.88                    | 0.07                       | 0.095                     | 0.224                        | 0.35                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,360                               | 52                   | Sites                 | 3.82                    | 0.02                       | 0.07                      | 0.907                        | 15.6                       | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) | 23                  | 1,908,568                     | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) | 100M - 250M                  |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Bradley et al. 2018 (Finished) [53]                           | 2016        | 26                                  | 1                    | Sites                 | 3.85                    | 0.04688                    | 0.0469                    | 0.0469                       | 0.04688                    | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 47                                  | 2                    | Sites                 | 4.26                    | 0.03                       | 0.3                       | 0.57                         | 0.57                       | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 824                                 | 39                   | Sites                 | 4.73                    | 0.03                       | 0.175                     | 1.71                         | 4.02                       | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 871                                 | 41                   | Sites                 | 4.71                    | 0.03                       | 0.175                     | 1.71                         | 4.02                       | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                                  | 2                    | Sites                 | 5.26                    | 0.03401                    | 0.301                     | 0.515                        | 0.5687                     | ug/L        |       |
| Arnold et al. 2016 (Unfiltered) [7]                           | 2012 - 2013 | 527                                 | 11                   | Sites                 | 2.09                    | 0.02                       | 0.08                      | 0.18                         | 0.56                       | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water                              | Date        | Source                              | Value                | Units                 | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Exposure exposure                                  |      | 0.000000574                                   |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value     | Units                   | Notes |
|-------------------------------------------------------------------|------------|-----------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 7.58302   | days                    |       |
| Boiling point                                                     | OPERA QSAR | -36.5186  | degree C                |       |
| Boiling point                                                     | TEST QSAR  | -10.361   | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 5705.02   | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 3273.41   | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0211658 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.159221  | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 10.1839   | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 4.19759   | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.0424827 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 1.00459   | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985.                                                                    |
| 221              | USEPA. 1993. Chemical Assessment Summary, Chlorodifluoromethane. U.S. Environmental Protection Agency, National Center for Environmental Protection, Integrated Risk Information System (IRIS), Washington, D.C.                                                                                                                                                                                                                   |

**Heroin**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                        |                                                                                                  |
|------------------------|--------------------------------------------------------------------------------------------------|
| <b>Name:</b>           | Heroin                                                                                           |
| <b>CASRN:</b>          | 561-27-3                                                                                         |
| <b>DTXSID:</b>         | <a href="#">DTXSID6046761</a>                                                                    |
| <b>Use:</b>            | Addictive substance of abuse; used for the relief of severe pain, especially in terminal illness |
| <b>Chemical Notes:</b> |                                                                                                  |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxics                                 |  |
| PubMed Neurotoxics                                |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

**CONTAMINANT SUMMARY & DECISION**

|                                 |                                   |
|---------------------------------|-----------------------------------|
| <b>Draft CCL5 List Decision</b> | <b>Final Hazard Quotient (HQ)</b> |
| Not List                        |                                   |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity | Prevalence | Magnitude |
|---------|----------|------------|-----------|
|         |          |            |           |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect | Target Pop. | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------|-------------|-------------------|----------------------|
|                                                          |                        |                 |             |                   |                      |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|------|
|                              |                                               |                                      |        |      |

**PUBLIC NOMINATION STATUS**

|                          |
|--------------------------|
| <b>Public Nomination</b> |
| X                        |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Heroin

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                     |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-----------------------------------------------------------|
|              |       |       |                   |                |                 |                   |                             |            |                          | NOTE: derivative of morphine; no health assessments found |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

| Data Element             | Value | Units | Source    | Notes |
|--------------------------|-------|-------|-----------|-------|
| <b>Modeled Data</b>      |       |       |           |       |
| LD50                     |       |       | TEST QSAR |       |
| Ames mutagenicity test   |       |       | TEST QSAR |       |
| Developmental toxin test |       |       | TEST QSAR |       |

## Heroin

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data | Date | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|------------------------------------------|------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                    |      |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                          |      |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                          |      |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                     |      |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                          |      |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                          |      |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>              |      |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                          |      |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                          |      |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water         | Date | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                          |      |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expcast exposure                                   |      |                                               |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

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| Reference<br>Number | Full Reference |
|---------------------|----------------|
|                     |                |



## Hexazinone

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                  |
|-----------------|----------------------------------|
| Name:           | Hexazinone                       |
| CASRN:          | 51235-04-2                       |
| DTXSID:         | <a href="#">DTXSID4024145</a>    |
| Use:            | Post emergence contact herbicide |
| Chemical Notes: |                                  |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.00007                    |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 9          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                           | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 300                    | decreased body weight, hepatotoxicity (clinical chemical changes and microscopic lesions) | general population | OPP               | 2015                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.021                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

|                   |
|-------------------|
| Public Nomination |
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

## Basis

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Hexazinone

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                                                                           | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                                                                                                                                                                                                                                  |
|------------------------------------|-------|-----------|-------------------|----------------|-------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.05  | mg/kg/day | OPP 2015          | Dalgard 1991   | decreased body weight, hepatotoxicity (clinical chemical changes and microscopic lesions) | general population | 33.8                        | 296        | [349]                    | NOTE: Though this compound is listed as having a D cancer classification in the OPP assessment, the document also states: "Hexazinone is classified as "Likely at high doses, but unlikely to be carcinogenic to humans at low doses." Therefore, a cancer dietary exposure analysis is not required." |
| Cancer Classification (CC)         | D     |           | OPP 2015          |                |                                                                                           |                    |                             |            | [349]                    | NOTE: Though this compound is listed as having a D cancer classification in the OPP assessment, the document also states: "Hexazinone is classified as "Likely at high doses, but unlikely to be carcinogenic to humans at low doses." Therefore, a cancer dietary exposure analysis is not required." |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units | Source         | Notes |
|---------------------------------------------|-------|-------|----------------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |                |       |
| 10-day Health Advisory                      | 2     | mg/L  | EPA DWSHA 2018 |       |
| Lifetime Health Advisory                    | 0.4   | mg/L  | EPA DWSHA 2018 |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 3400      | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 860       | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 37.57     | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 900       | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 400       | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 5         | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 1.26      | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 122.5     | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 440.39999 | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 31.6      | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 87.3      | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0074473 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.624     | no units | TEST QSAR |       |
| Developmental toxin test | 1.093     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Hexazinone  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

July 2021

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 4,886                         | 375               | Sites              | 7.67                 | 1.00E - 04              | 0.00382                | 0.021                     | 1.23                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 582                           | 211               | Sites              | 36                   | 1.00E - 04              | 0.00361                | 0.019                     | 1.23                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 4,304                         | 164               | Sites              | 3.81                 | 0.00015                 | 0.01                   | 0.0871                    | 1.13                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 27               | 483,326                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 3                | 1,574                      | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 10                            | 3                 | Sites               | 30                   | 8e-04                   | 8e-04                  | 0.0025                    | 0.087                   | ug/L        |       |
| Bradley et al. 2018 (Finished) [53]                                                    | 2016        | 26                            | 2                 | Sites               | 7.69                 | 0.0065                  | 0.0076                 | 0.00848                   | 0.0087                  | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 227                           | 17                | Sites               | 7.49                 | 8e-04                   | 8e-04                  | 0.0115                    | 0.11                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 218                           | 14                | Sites               | 6.42                 | 8e-04                   | 0.0046                 | 0.0122                    | 0.021                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 10                            | 3                 | Sites               | 30                   | 8e-04                   | 8e-04                  | 0.00425                   | 0.11                    | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 1,615                         | 347               | Sites               | 21                   | 0.0036                  | 0.025                  | 0.128                     | 35                      | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 7                 | Sites               | 18                   | 0.0029                  | 0.0168                 | 0.036                     | 0.0466                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 39                | Sites               | 5.65                 | 3e-04                   | 0.0016                 | 0.00666                   | 0.0929                  | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                                     | 2002 - 2010 | 71                            | 19                | Samples             | 27                   |                         |                        |                           | 0.097                   | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 7.69E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.72279     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 324.385     | degree C                |       |
| Boiling point                                                  | TEST QSAR  |             |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00000035  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000000111 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0801096   | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00772681  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 2.40816     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 5.98412     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000000166 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 1.76651     | no units                |       |

**Hexazinone**

CCL 5 Contaminant Information Sheet

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985.                                                                    |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 349              | USEPA. 2015. Hexazinone: Draft Human Health Risk Assessment for Registration Review. EPA-HQ-OPP-2009-0755-0019. DP No. D424526. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                         |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

## Imazalil

CCL 5 Contaminant Information Sheet

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Imazalil                      |
| CASRN:          | 35554-44-0                    |
| DTXSID:         | <a href="#">DTXSID8024151</a> |
| Use:            | Fungicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.13                       |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 4       | carcinogen with linear MOA | 10         | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect      | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.5                    | hepatocytic neoplasm | general population | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0654                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Imazalil

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units          | Assessment Source | Critical Study   | Critical Effect                                                                                                               | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|----------------|-------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.108  | mg/kg/day      | OPP 2018          | Van Deun 1999    | reductions in body weight and weight gain and macro and microscopic effects in the liver (male and female) and thyroid (male) | general population | 33.8                        | 639        | [399]                    |       |
| Cancer Slope Factor (CSF)          | 0.0611 | (mg/kg/day)^-1 | OPP 2018          | Verstraeten 1993 | hepatocytic neoplasm                                                                                                          | general population | 33.8                        | 0.484      | [399]                    |       |
| Cancer Classification (CC)         | L      |                | OPP 2018          |                  |                                                                                                                               |                    |                             |            | [399]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value    | Units          | Source   | Notes |
|---------------------------------------------|----------|----------------|----------|-------|
| <b>Measured Data and Assessment Results</b> |          |                |          |       |
| Acute Human Health Benchmark                | 0.47     | mg/L           | EPA HHBP |       |
| Acute PAD                                   | 0.017    | mg/kg/day      | EPA HHBP |       |
| Cancer Slope Factor (CSF)                   | 0.0611   | (mg/kg/day)^-1 | EPA HHBP |       |
| Chronic Human Health Benchmark              | 0.016    | mg/L           | EPA HHBP |       |
| Chronic Human Health Benchmark              | 0.000524 | mg/L           | EPA HHBP |       |
| Population-Adjusted Dose (PAD)              | 0.0025   | mg/kg/day      | EPA HHBP |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 227       | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 640       | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 120       | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 20        | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 2.5       | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 40        | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 32.93     | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 20        | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 37.900002 | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 15        | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 22.3      | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0028973 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.541     | no units | TEST QSAR |       |
| Developmental toxin test | 0.281     | no units | TEST QSAR |       |

Imazalil  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

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## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 14                            | 2                 | Sites              | 14                   | 0.0534                  | 0.0609                 | 0.0654                    | 0.0684                  | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 14                            | 2                 | Sites              | 14                   | 0.0534                  | 0.0609                 | 0.0654                    | 0.0684                  | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 1                | 36,692                    | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 132                           | 7                 | Sites               | 5.3                  | 0.0116                  | 0.0307                 | 0.1                       | 0.119                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 3                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 135                           | 7                 | Sites               | 5.19                 | 0.0116                  | 0.0307                 | 0.1                       | 0.119                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 191                           | 12                | Sites               | 6.28                 | 0.0116                  | 0.03                   | 0.0965                    | 0.1189                  | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 3                 | Sites               | 7.89                 | 0.0517                  | 0.0521                 | 0.221                     | 0.2634                  | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 1.65E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.35613     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 346.361     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 344.153     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00000235  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.00000314  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000551691 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.000328095 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 35.0705     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 168.655     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000000522 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.66695     | no units                |       |

**Imazalil**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                         |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                       |
| 399              | USEPA. 2018. Imazalil. Acute, Chronic, and Cancer Dietary (Food Only) Exposure and Risk Assessment in Support of the HED Draft Risk Assessment for Registration Review. EPA-HQ-OPP-2013-0305-0026. DP No. D446973. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.          |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society. |



## Imazapyr

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Imazapyr                      |
| CASRN:          | 81334-34-1                    |
| DTXSID:         | <a href="#">DTXSID8034665</a> |
| Use:            | Herbicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.0079                     |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 3       | no adverse effects | 4          | 6         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect               | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 10000                  | no adverse effects identified | general population | OPP               | 2006                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW)       | Source | Date |
|------------------------------|-----------------------------------------------|--------------------------------------------|--------|------|
| 79                           |                                               | EDWC SW 30-Year mean (chronic, non-cancer) | OPP    | 2006 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

## Basis

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

Imazapyr  
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**Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units     | Assessment Source | Critical Study     | Critical Effect                                | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|--------------------|------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 2.5   | mg/kg/day | OPP 2006          | Shellenberger 1987 | no effects identified at loael selected as pod | general population | 33.8                        | 14800      | [271]                    |       |
| Cancer Classification (CC)         | E     |           | OPP 2006          |                    |                                                |                    |                             |            | [271]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Chronic Human Health Benchmark              | 16    | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 16    | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 2.5   | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 2000  | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 5000  | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 1000  | mg/kg/day | EPA Toxicity Reference Database |       |
| NOAEL                                            | 300   | mg/kg/day | EPA Toxicity Reference Database |       |
| Percent of active toxcast in vitro assays tested | 1.48  | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0046026 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.624     | no units | TEST QSAR |       |
| Developmental toxin test | 0.879     | no units | TEST QSAR |       |

Imazapyr

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 4                | 358,171                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                                                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects                               | Minimum Conc. (Detects)                                                                                                                                                                                                                                                                                                    | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                              |             |                               |                   |                     |                                                    |                                                                                                                                                                                                                                                                                                                            |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                                       | 2001 - 2013 | 15                            | 9                 | Sites               | 60                                                 | 0.001498                                                                                                                                                                                                                                                                                                                   | 0.002                  | 0.0097                    | 0.2                     | ug/L        |       |
| <b>Ambient Water</b>                                                                               |             |                               |                   |                     |                                                    |                                                                                                                                                                                                                                                                                                                            |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                                      | 2008 - 2017 | 3                             | 1                 | Sites               | 33                                                 | 0.026                                                                                                                                                                                                                                                                                                                      | 0.026                  | 0.026                     | 0.026                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                                          | 2008 - 2017 | 3                             | 1                 | Sites               | 33                                                 | 0.026                                                                                                                                                                                                                                                                                                                      | 0.026                  | 0.026                     | 0.026                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                             | 2001 - 2013 | 227                           | 114               | Sites               | 50                                                 | 0.001498                                                                                                                                                                                                                                                                                                                   | 0.0035                 | 0.02                      | 3.054                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                                    | 2001 - 2013 | 219                           | 107               | Sites               | 49                                                 | 0.0015                                                                                                                                                                                                                                                                                                                     | 0.0149                 | 0.131                     | 3.054                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                                      | 2001 - 2013 | 10                            | 8                 | Sites               | 80                                                 | 0.001498                                                                                                                                                                                                                                                                                                                   | 0.002                  | 0.01                      | 0.21                    | ug/L        |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                                                 | 2002 - 2010 | 52                            | 7                 | Samples             | 14                                                 |                                                                                                                                                                                                                                                                                                                            |                        |                           | 0.209                   | ug/L        |       |
| <b>Waste Water Effluent</b>                                                                        |             |                               |                   |                     |                                                    |                                                                                                                                                                                                                                                                                                                            |                        |                           |                         |             |       |
|                                                                                                    |             |                               |                   |                     |                                                    |                                                                                                                                                                                                                                                                                                                            |                        |                           |                         |             |       |
|                                                                                                    |             |                               |                   |                     |                                                    |                                                                                                                                                                                                                                                                                                                            |                        |                           |                         |             |       |
|                                                                                                    |             |                               |                   |                     |                                                    |                                                                                                                                                                                                                                                                                                                            |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                            | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>                                       | <b>Notes</b>                                                                                                                                                                                                                                                                                                               |                        |                           |                         |             |       |
| Estimated Drinking Water Concentration (EDWC) in Surface Water, 30-Year Mean (chronic, non-cancer) | 2006        | OPP                           | 79                | ug/L                | Tier 1 FQPA Index Reservoir Screening Tool (FIRST) | The modeled surface water chronic, non-cancer concentration provided by the most recent available EPA OPP health assessment was selected as the occurrence concentration for imazapyr. This value coincides with the chronic health effects data which report no adverse effects seen after chronic exposures to imazapyr. |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 9.23E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value     | Units                   | Notes |
|----------------------------------------------------------------|------------|-----------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.33907   | days                    |       |
| Boiling point                                                  | OPERA QSAR | 276.309   | degree C                |       |
| Boiling point                                                  | TEST QSAR  |           |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 1.73E-10  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 1.43E-08  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0301436 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0043451 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 5.19409   | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 1.93197   | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 3.08E-10  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 0.4738    | no units                |       |

**Imazapyr**

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| Reference Number | Full Reference                                                                                                                                                                                                         |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                  |
| 271              | USEPA. 2006. Reregistration Eligibility Decision for Imazapyr. EPA-HQ-OPP-2005-0495-0031. OPP-2005-0495. U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Washington, D.C. |

## Imazaquin

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                                    |
|-----------------|----------------------------------------------------|
| Name:           | Imazaquin                                          |
| CASRN:          | 81335-37-7                                         |
| DTXSID:         | <a href="#">DTXSID3024152</a>                      |
| Use:            | Herbicide used on broad leaved weeds in soya beans |
| Chemical Notes: |                                                    |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.00018                    |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 4       | non-cancer effects | 9          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                                                     | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 1000                   | decreased body weights (within 4 weeks of exposure), slight anemia, clinical chemistry/hematology changes, and evidence of skeletal muscle myopathy | general population | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.18                         | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Imazaquin

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study                  | Critical Effect                                                                                                                                           | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.25  | mg/kg/day | OPP 2018          | American Cyanamid Company, 1984 | decreased body weights (within first 4 weeks of exposure), slight anemia, clinical chemistry/hematology changes, and evidence of skeletal muscle myopathy | general population | 33.8                        | 1480       | [400]                    |       |
| Cancer Classification (CC)         | E     |           | OPP 2018          |                                 |                                                                                                                                                           |                    |                             |            | [400]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Chronic Human Health Benchmark              | 1.6   | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 1.6   | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.25  | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 2363  | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 5000  | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 125   | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 600   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 25    | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 250   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 1.65  | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value    | Units    | Source    | Notes |
|--------------------------|----------|----------|-----------|-------|
| <b>Modeled Data</b>      |          |          |           |       |
| LD50                     | 0.011298 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.56     | no units | TEST QSAR |       |
| Developmental toxin test | 0.945    | no units | TEST QSAR |       |

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OCCURRENCE DATA

EPA-OGWDW and OST

July 2021

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 4,148                         | 170               | Sites               | 4.1                  | 0.00102                 | 0.0154                 | 0.18                      | 5.9                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 472                           | 114               | Sites               | 24                   | 0.00102                 | 0.0151                 | 0.18                      | 5.9                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 3,676                         | 56                | Sites               | 1.52                 | 0.00152                 | 0.02                   | 0.132                     | 0.7                     | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 15               | 52,207                    | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                           | 2001 - 2013 | 17                            | 5                 | Sites               | 29                   | 0.0018                  | 0.004                  | 0.0184                    | 0.047                   | ug/L        |       |
| <b>Ambient Water</b>                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)          | 2008 - 2017 | 475                           | 31                | Sites               | 6.53                 | 0.00159                 | 0.0131                 | 0.0792                    | 0.255                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)            | 2008 - 2017 | 1,051                         | 27                | Sites               | 2.57                 | 0.00093                 | 0.01                   | 0.02                      | 0.07                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)              | 2008 - 2017 | 1,526                         | 58                | Sites               | 3.8                  | 0.00093                 | 0.01                   | 0.056                     | 0.255                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated) | 2001 - 2013 | 229                           | 17                | Sites               | 7.42                 | 0.0018                  | 0.00735                | 0.0245                    | 0.058                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                        | 2001 - 2013 | 219                           | 12                | Sites               | 5.48                 | 0.0018                  | 0.008                  | 0.0357                    | 0.0458                  | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                          | 2001 - 2013 | 12                            | 5                 | Sites               | 42                   | 0.0018                  | 0.005                  | 0.0228                    | 0.058                   | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                     | 2012 - 2014 | 38                            | 3                 | Sites               | 7.89                 | 0.0128                  | 0.0133                 | 0.0322                    | 0.0369                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                      | 2012 - 2013 | 690                           | 6                 | Sites               | 0.87                 | 0.0015                  | 0.00305                | 0.0289                    | 0.05                    | ug/L        |       |
| <b>Waste Water Effluent</b>                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 8.51E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.34801     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 288.545     | degree C                |       |
| Boiling point                                                  | TEST QSAR  |             |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 1.27E-10    | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 5.35E-10    | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000453923 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.000450817 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 2.886       | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 3.4435      | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 2.11E-10    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 1.87775     | no units                |       |

**Imazaquin**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 400              | USEPA. 2018. Imazaquin: Draft Human Health Risk Assessment for Registration Review. EPA-HQ-OPP-2014-0224-0020. DP No. D445078. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                          |



## Imazethapyr

CCL 5 Contaminant Information Sheet

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                              |
|-----------------|----------------------------------------------|
| Name:           | Imazethapyr                                  |
| CASRN:          | 81335-77-5                                   |
| DTXSID:         | <a href="#">DTXSID3024287</a>                |
| Use:            | Herbicide used on annual and perennial grass |
| Chemical Notes: |                                              |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.0000093                  |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 3       | no adverse effects | 9          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 10000                  | no effects identified at loael selected as pod | general population | OPP               | 2002                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.09264                      | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

## Basis

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Imazethapyr

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study             | Critical Effect                                | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------------------|------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 2.5   | mg/kg/day | OPP 2002          | American Cyanamid Co. 1987 | no effects identified at loael selected as pod | general population | 33.8                        | 14800      | [250]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2002          |                            |                                                |                    |                             |            | [250]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Chronic Human Health Benchmark              | 16    | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 16    | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 2.5   | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 5000  | mg/kg     | NIH HSDB                        |       |
| LOAEL                                            | 125   | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 1500  | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 25    | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 750   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 1.27  | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value    | Units    | Source    | Notes |
|--------------------------|----------|----------|-----------|-------|
| <b>Modeled Data</b>      |          |          |           |       |
| LD50                     | 0.001349 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.639    | no units | TEST QSAR |       |
| Developmental toxin test | 0.927    | no units | TEST QSAR |       |

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Imazethapyr  
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OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 4,118                         | 232               | Sites               | 5.63                 | 4.00E - 05              | 0.0167                 | 0.0926                    | 2.71                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 472                           | 174               | Sites               | 37                   | 4.00E - 05              | 0.0167                 | 0.0938                    | 2.71                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 3,646                         | 58                | Sites               | 1.59                 | 0.00021                 | 0.0131                 | 0.07                      | 0.242                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 43               | 641,374                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 5                 | Sites               | 29                   | 0.002                   | 0.004                  | 0.018                     | 0.063                   | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 475                           | 71                | Sites               | 15                   | 0.00112                 | 0.0172                 | 0.0726                    | 0.65                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 1,057                         | 10                | Sites               | 0.95                 | 0.00674                 | 0.01                   | 0.0189                    | 0.02                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 1,532                         | 81                | Sites               | 5.29                 | 0.00112                 | 0.0162                 | 0.0686                    | 0.65                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 52                | Sites               | 23                   | 0.001665                | 0.004                  | 0.0157                    | 0.137                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 47                | Sites               | 21                   | 0.001665                | 0.00255                | 0.00304                   | 0.0082                  | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 5                 | Sites               | 42                   | 0.002                   | 0.004                  | 0.0174                    | 0.137                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 35                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 14                | Sites               | 2.03                 | 0.000211                | 0.0037                 | 0.0249                    | 0.07                    | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 9.56E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|----------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.34063    | days                    |       |
| Boiling point                                                  | OPERA QSAR | 277.233    | degree C                |       |
| Boiling point                                                  | TEST QSAR  |            |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 1.57E-10   | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 5.12E-09   | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00538382 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00181552 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 4.52231    | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 2.50611    | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 9.25E-10   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 1.45322    | no units                |       |

**Imazethapyr**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 250              | USEPA. 2002. Health Effects Division (HED) Risk Assessment for Imazethapyr. EPA-HQ-OPP-2002-0189-0003. DP Nos. D232428 D269226 D277925. U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Washington, D.C.                                                                                                                                                                              |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                    |

**Imidacloprid**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                             |
|-----------------|-------------------------------------------------------------|
| Name:           | Imidacloprid                                                |
| CASRN:          | 138261-41-3                                                 |
| DTXSID:         | <a href="#">DTXSID5032442</a>                               |
| Use:            | Insecticide used on pests on agricultural and nursery crops |
| Chemical Notes: |                                                             |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.00018                    |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 4       | non-cancer effects | 9          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 500                    | increased incidence of tremors | general population | OPP               | 2017                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.09098                      | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Imidacloprid

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                | Target Population  | Exposure Factor (mL/kg-) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|--------------------------------|--------------------|--------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.08  | mg/kg/day | OPP 2017          | Ruf 1990       | increased incidence of tremors | general population | 33.8                     | 473        | [384]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2017          |                |                                |                    |                          |            | [384]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|--------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                          |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 0.93  | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.14  | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.36  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.36  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.057 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 4870  | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 98    | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 16.9  | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 414   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 274   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 7.6   | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 0.84  | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0012162 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.912     | no units | TEST QSAR |       |
| Developmental toxin test | 0.805     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Imidacloprid  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 4,177                         | 399               | Sites              | 9.55                 | 0.00066                 | 0.0242                 | 0.091                     | 2.15                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 471                           | 272               | Sites              | 58                   | 0.00066                 | 0.0242                 | 0.089                     | 2.15                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 3,706                         | 127               | Sites              | 3.43                 | 0.00151                 | 0.0269                 | 0.226                     | 1.99                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 48               | 987,466                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 8                 | Sites               | 47                   | 0.002498                | 0.0025                 | 0.0106                    | 0.099                   | ug/L        |       |
| Bradley et al. 2018 (Finished) [53]                                                    | 2016        | 26                            | 3                 | Sites               | 12                   | 0.004                   | 0.0072                 | 0.00952                   | 0.0101                  | ug/L        |       |
| Klarich et al. 2017 (Finished) [117]                                                   | 2016        | 20                            | 16                | Sites               | 80                   | 0.00122                 | 0.00396                | 0.0162                    | 0.02636                 | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 624                           | 203               | Sites               | 33                   | 0.00071                 | 0.0245                 | 0.155                     | 4.18                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 1,057                         | 32                | Sites               | 3.03                 | 0.00351                 | 0.03                   | 0.282                     | 4.48                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 1,681                         | 235               | Sites               | 14                   | 0.00071                 | 0.0245                 | 0.158                     | 4.48                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 23                | Sites               | 10                   | 0.002498                | 0.006                  | 0.0264                    | 0.202                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 18                | Sites               | 8.22                 | 0.0025                  | 0.0103                 | 0.031                     | 0.124                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 5                 | Sites               | 42                   | 0.002498                | 0.0025                 | 0.0247                    | 0.202                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 1,031                         | 668               | Sites               | 65                   | 0.0201                  | 0.222                  | 1.23                      | 12.7                    | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 14                | Sites               | 37                   | 0.0036                  | 0.0275                 | 0.0696                    | 0.1428                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 14                | Sites               | 2.03                 | 0.0015                  | 0.0126                 | 0.0782                    | 0.741                   | ug/L        |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                                     | 2002 - 2010 | 126                           | 2                 | Samples             | 1.6                  |                         |                        |                           | 0.159                   | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                   |      | 1.54E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|-------------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.541      | days                    |       |
| Boiling point                                                     | OPERA QSAR | 322.953    | degree C                |       |
| Boiling point                                                     | TEST QSAR  |            |                         |       |
| Vapor pressure                                                    | OPERA QSAR | 1.19E-09   | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  |            |                         |       |
| Solubility in water                                               | OPERA QSAR | 0.00210815 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.00205589 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 9.64405    | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  |            |                         |       |
| Henry's Law constant                                              | OPERA QSAR | 2.56E-10   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 0.599499   | no units                |       |

**Imidacloprid**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985.                                                                    |
| 117              | Klarich, K.L., Pflug, N.C., DeWald, E.M., Hladik, M.L., Kolpin, D.W., Cwiertny, D.M. and LeFevre, G.H., 2017. Occurrence of neonicotinoid insecticides in finished drinking water and fate during drinking water treatment. <i>Environmental Science &amp; Technology Letters</i> , 4(5), pp.168-173.                                                                                                                              |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 384              | USEPA. 2017. Imidacloprid. Acute and Chronic Aggregate Dietary (Food and Drinking Water) Exposure and Risk Assessments for the Registration Review Risk Assessment. EPA-HQ-OPP-2008-0844-1236. DP Nos. D438392 D438433. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                 |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |



## Indoxacarb

CCL 5 Contaminant Information Sheet

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Indoxacarb                    |
| CASRN:          | 173584-44-6                   |
| DTXSID:         | <a href="#">DTXSID1032690</a> |
| Use:            | Broad spectrum insecticide    |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.00069                    |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 6          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                                      | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 100                    | decreased body weight, body weight gain, food consumption, and food efficiency; decreased hematocrit, hemoglobin and red blood cells | general population | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.069398                     | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

## Basis

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Indoxacarb

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study                             | Critical Effect                                                                | Target Population  | Exposure Factor (mL/kg-) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|--------------------------------------------|--------------------------------------------------------------------------------|--------------------|--------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.02  | mg/kg/day | OPP 2018          | Long et al. 1998; Frame 1997; Breslin 1997 | decreased body weight, body weight gain, food consumption, and food efficiency | general population | 33.8                     | 118        | [401]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2018          |                                            |                                                                                |                    |                          |            | [401]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|--------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                          |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 0.8   | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.12  | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.1   | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.1   | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.02  | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 1732      | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 268       | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 1000      | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 2.1300001 | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 1.114     | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 500       | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 18.17     | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 3.78      | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 30        | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 16        | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 3.09      | mg/kg/day | EPA Toxicity Reference Database | min   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0007798 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.589     | no units | TEST QSAR |       |
| Developmental toxin test | 1.1       | no units | TEST QSAR |       |

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,761                               | 12                   | Sites                 | 0.68                    | 0.00104                    | 0.0017                    | 0.0694                       | 0.273                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 322                                 | 11                   | Sites                 | 3.42                    | 0.00104                    | 0.00153                   | 0.00338                      | 0.0859                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,439                               | 1                    | Sites                 | 0.07                    | 0.273                      | 0.273                     | 0.273                        | 0.273                      | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 32               | 100,007                      | 2016 | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 359                                 | 4                    | Sites                  | 1.11                    | 0.00195                    | 0.107                     | 0.169                        | 0.187                      | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 528                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 887                                 | 4                    | Sites                  | 0.45                    | 0.00195                    | 0.107                     | 0.169                        | 0.187                      | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 202                                 | 7                    | Sites                  | 3.47                    | 0.066                      | 0.071                     | 0.851                        | 2.01                       | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 584                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Exposure exposure                                  |      | 0.000000197                                   |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 5.1378      | days                    |       |
| Boiling point                                                     | OPERA QSAR | 349.98      | degree C                |       |
| Boiling point                                                     | TEST QSAR  |             |                         |       |
| Vapor pressure                                                    | OPERA QSAR | 2.38E-10    | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 8.99E-11    | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0000344   | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.00000211  | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 4.57962     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 36.7282     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.000000022 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 4.33162     | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 401              | USEPA. 2018. Indoxacarb: Update to the Human Health Draft Risk Assessment for Indoxacarb to Support Registration Review and the Proposed New Use for Controlling Ants at Ornamental Nurseries, Sod Farms, and Livestock Corrals of non-Food Bearing Animals. EPA-HQ-OPP-2013-0367-0050. DP No. D445517. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                 |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                    |

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Iprodione                     |
| CASRN:          | 36734-19-7                    |
| DTXSID:         | <a href="#">DTXSID3024154</a> |
| Use:            | Fungicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 3.2                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 5       | carcinogen with linear MOA | 7          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect   | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.7                    | leydig cell tumor | general population | OPP               | 2012                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 2.208                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units          | Assessment Source | Critical Study                                              | Critical Effect            | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|----------------|-------------------|-------------------------------------------------------------|----------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.05   | mg/kg/day      | OPP 2012          | Blystone et al. 2007; Chambers et al. 1992; Larochelle 1993 | reduced serum testosterone | general population | 33.8                        | 296        | [325]                    |       |
| Cancer Slope Factor (CSF)          | 0.0439 | (mg/kg/day)^-1 | OPP 2012          | Chambers et al. 1992                                        | leydig cell tumor          | general population | 33.8                        | 0.674      | [325]                    |       |
| Cancer Classification (CC)         | L      |                | OPP 2012          |                                                             |                            |                    |                             |            | [325]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value    | Units          | Source                                  | Notes |
|---------------------------------------------|----------|----------------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |          |                |                                         |       |
| Acute Human Health Benchmark                | 1        | mg/L           | EPA HHBP                                |       |
| Acute PAD                                   | 0.05     | mg/kg/day      | EPA HHBP                                |       |
| Cancer Slope Factor (CSF)                   | 0.0439   | (mg/kg/day)^-1 | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.3      | mg/L           | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.000729 | mg/L           | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.3      | mg/L           | Health-based screening levels from USGS |       |
| Health-Based Screening Level                | 0.000729 | mg/L           | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.05     | mg/kg/day      | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 3500  | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 4000  | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 12.4  | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 200   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 2.5   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 90    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 8.93  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 151   | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 180   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 60    | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 89    | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0095719 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.085     | no units | TEST QSAR |       |
| Developmental toxin test | 1.168     | no units | TEST QSAR |       |

#### Nationally Representative Water Data

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 23               | 376,298                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

| Non-Nationally Representative Water Data                                               |  |      |        |       |       |       |       |  |  |  |  | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |  |
|----------------------------------------------------------------------------------------|--|------|--------|-------|-------|-------|-------|--|--|--|--|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|--|
| <b>Finished Water</b>                                                                  |  |      |        |       |       |       |       |  |  |  |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |  |
| USDA Pesticide Data Program (PDP) (Finished)                                           |  |      |        |       |       |       |       |  |  |  |  | 2001 - 2013 | 11                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |  |
| Bradley et al. 2018 (Finished) [53]                                                    |  |      |        |       |       |       |       |  |  |  |  | 2016        | 26                            | 2                 | Sites               | 7.69                 | 0.0174                  | 0.0174                 | 0.0174                    | 0.0174                  | ug/L        |       |  |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          |  |      |        |       |       |       |       |  |  |  |  | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |  |
| <b>Ambient Water</b>                                                                   |  |      |        |       |       |       |       |  |  |  |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |  |
| National Water Information System (USGS NWIS) (Surface Water)                          |  |      |        |       |       |       |       |  |  |  |  | 2008 - 2017 | 569                           | 33                | Sites               | 5.8                  | 0.006                   | 0.0346                 | 0.196                     | 1.24                    | ug/L        |       |  |
| National Water Information System (USGS NWIS) (Groundwater)                            |  |      |        |       |       |       |       |  |  |  |  | 2008 - 2017 | 2,014                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |  |
| National Water Information System (USGS NWIS) (All Water)                              |  |      |        |       |       |       |       |  |  |  |  | 2008 - 2017 | 2,582                         | 33                | Sites               | 1.28                 | 0.006                   | 0.0346                 | 0.196                     | 1.24                    | ug/L        |       |  |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 |  |      |        |       |       |       |       |  |  |  |  | 2001 - 2013 | 4                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |  |
| USDA Pesticide Data Program (PDP) (Untreated)                                          |  |      |        |       |       |       |       |  |  |  |  | 2001 - 2013 | 4                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |  |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] |  |      |        |       |       |       |       |  |  |  |  | 1990 - 2018 | 15                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |  |
| Bradley et al. 2017 (Ambient) [52]                                                     |  |      |        |       |       |       |       |  |  |  |  | 2012 - 2014 | 38                            | 3                 | Sites               | 7.89                 | 0.0246                  | 0.0304                 | 0.0745                    | 0.0855                  | ug/L        |       |  |
| Arnold et al. 2016 (Filtered) [7]                                                      |  |      |        |       |       |       |       |  |  |  |  | 2012 - 2013 | 106                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |  |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           |  |      |        |       |       |       |       |  |  |  |  | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |  |
| <b>Waste Water Effluent</b>                                                            |  |      |        |       |       |       |       |  |  |  |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |  |
|                                                                                        |  |      |        |       |       |       |       |  |  |  |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |  |
|                                                                                        |  |      |        |       |       |       |       |  |  |  |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |  |
|                                                                                        |  |      |        |       |       |       |       |  |  |  |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |  |
| Estimated Concentration in Water                                                       |  | Date | Source | Value | Units | Model | Notes |  |  |  |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |  |
|                                                                                        |  |      |        |       |       |       |       |  |  |  |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |  |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value     | Units                   | Notes |
|-------------------------------------------------------------------|------------|-----------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.35536   | days                    |       |
| Boiling point                                                     | OPERA QSAR | 352.665   | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 428.894   | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 5.56E-09  | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 7.85E-10  | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0000573 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0000681 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 210.915   | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 15.3815   | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 3.27E-09  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 2.99477   | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> .                                                         |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                                                                           |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985.                                                                                                                            |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                                                                         |
| 325              | USEPA. 2012. Iprodione. Acute Probabilistic, Chronic and Cancer Aggregate (Food and Drinking Water) Dietary Exposure and Risk Assessments for Parent and 3,5-DCA to Support New Section 3 Registration Actions on Cucurbits (Crop Group 9) and Fruiting Vegetables (Crop Group 8-10) and to Support a Tolerance for Imported Canola. EPA-HQ-OPP-2012-0392-0008. DP No. D392706. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C. |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                                                                                     |



## Isophorone

CCL 5 Contaminant Information Sheet

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                                                                          |
|-----------------|------------------------------------------------------------------------------------------|
| Name:           | Isophorone                                                                               |
| CASRN:          | 78-59-1                                                                                  |
| DTXSID:         | <a href="#">DTXSID8020759</a>                                                            |
| Use:            | Solvent mixtures for finishes, for polyvinyl and nitrocellulose resins, stoving lacquers |
| Chemical Notes: |                                                                                          |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 | X |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.0026                     |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 2       | carcinogen with linear MOA | 9          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect            | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 50                     | preputial gland carcinomas | general population | OPP               | 1999                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.129                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

## Basis

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Isophorone

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value    | Units          | Assessment Source | Critical Study                    | Critical Effect                                          | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|----------|----------------|-------------------|-----------------------------------|----------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.2      | mg/kg/day      | IRIS 1989         | Nor-Am Agricultural Products 1972 | no adverse effects at highest dose tested                | general population | 33.8                        | 1180       | [204]                    |       |
| Reference Dose (RfD) or Equivalent | 0.15     | mg/kg/day      | OW 1992           | Nor-Am Agricultural Products 1972 | no adverse effects at highest dose tested                | general population | 33.8                        | 888        | [220]                    |       |
| Reference Dose (RfD) or Equivalent | 0.15     | mg/kg/day      | OPP 1999          | Nor-Am Agricultural Products 1972 | no adverse effects at highest dose tested                | general population | 33.8                        | 888        | [234]                    |       |
| Reference Dose (RfD) or Equivalent | 0.2      | mg/kg/day      | ATSDR 2018        | NTP 1986                          | hepatic, renal, and gastrointestinal lesions             | general population | 33.8                        | 1180       | [36]                     |       |
| Cancer Slope Factor (CSF)          | 0.00095  | (mg/kg/day)^-1 | IRIS 1989         | NTP 1986                          | preputial gland carcinoma                                | general population | 33.8                        | 31.1       | [204]                    |       |
| Cancer Slope Factor (CSF)          | 0.004    | (mg/kg/day)^-1 | OW 1992           | NTP 1986                          | renal tubular cell tumors and preputial gland carcinomas | general population | 33.8                        | 7.40       | [220]                    |       |
| Cancer Slope Factor (CSF)          | 0.000608 | (mg/kg/day)^-1 | OPP 1999          | NTP 1986                          | preputial gland carcinoma                                | general population | 33.8                        | 48.7       | [234]                    |       |
| Cancer Classification (CC)         | C        |                | IRIS 1989         |                                   |                                                          |                    |                             |            | [204]                    |       |
| Cancer Classification (CC)         | C        |                | OW 1992           |                                   |                                                          |                    |                             |            | [220]                    |       |
| Cancer Classification (CC)         | C        |                | OPP 1999          |                                   |                                                          |                    |                             |            | [234]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     | 2017-07-01           | 2020-02-13         | 25                                             | 0                                               | 2                                              |                                                   |

## Other Health Data

| Data Element                                | Value          | Units     | Source                            | Notes |
|---------------------------------------------|----------------|-----------|-----------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |                |           |                                   |       |
| 10-day Health Advisory                      | 15             | mg/L      | EPA DWSHA 2018                    |       |
| Chronic Health-Based Guidance Value         | 0.1            | mg/L      | MN DOH                            |       |
| Human Health Ambient Water Quality Criteria | 0.034          | mg/L      | EPA Human Health Criteria for CWA |       |
| Intermediate Minimal Risk Level (MRL)       | 3              | mg/kg/day | CDC ATSDR                         |       |
| Lifetime Health Advisory                    | 0.04           | mg/L      | EPA DWSHA 2018                    |       |
| Lifetime Health Advisory                    | 0.1            | mg/L      | EPA DWSHA 2018                    |       |
| Reference Concentration (RfC)               | 2000           | ug/m^3    | CalEPA OEHHA Chemical Database    |       |
| Cancer Classification (CC)                  | Female.Mice NE | no units  | HHS NTP                           |       |
| Cancer Classification (CC)                  | Female.Rats NE | no units  | HHS NTP                           |       |
| Cancer Classification (CC)                  | Male.Mice EE   | no units  | HHS NTP                           |       |
| Cancer Classification (CC)                  | Male.Rats SE   | no units  | HHS NTP                           |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                  | Notes |
|--------------------------------------------------|-------|-----------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                         |       |
| LD50                                             | 1000  | mg/kg     | NIH HSDB                | min   |
| LD50                                             | 3200  | mg/kg     | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 2.72  | percent   | EPA Chemistry Dashboard |       |
| TD50                                             | 16600 | mg/kg/day | NIH CPDB                | max   |
| TD50                                             | 203   | mg/kg/day | NIH CPDB                | min   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0104954 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.25      | no units | TEST QSAR |       |
| Developmental toxin test | 0.944     | no units | TEST QSAR |       |

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Draft Fifth Contaminant Candidate List (CCL 5)  
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EPA - Office of Water

Isophorone  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,920                         | 52                | Sites               | 2.71                 | 0.003                   | 0.01                   | 0.129                     | 3.9                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 150                           | 36                | Sites               | 24                   | 0.003                   | 0.01                   | 0.0991                    | 3.9                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,770                         | 16                | Sites               | 0.9                  | 0.005                   | 0.0105                 | 0.316                     | 0.54                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) | 10M - 50M                    |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 12                            | 1                 | Sites               | 8.33                 | 0.149                   | 0.149                  | 0.149                     | 0.149                   | ug/L        |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                            | NA                | Sites               | 4                    |                         | 0.032                  |                           | 0.032                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 47                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 830                           | 414               | Sites               | 50                   | 0.002                   | 0.011                  | 0.0437                    | 18.2                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 1,871                         | 99                | Sites               | 5.29                 | 0.002                   | 0.013                  | 0.0605                    | 0.18                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 2,701                         | 513               | Sites               | 19                   | 0.002                   | 0.011                  | 0.0452                    | 18.2                    | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                            | 24                | Sites               | 63                   | 0.0038                  | 0.012                  | 0.0267                    | 0.0991                  | ug/L        |       |
| Arnold et al. 2016 (Unfiltered) [7]                           | 2012 - 2013 | 527                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                             | 1                 | Sites               | 50                   |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                            | 14                | Sites               | 67                   | 0.017                   | 0.03                   | 0.0694                    | 0.081                   | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.0000459                               |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value     | Units                   | Notes |
|----------------------------------------------------------------|------------|-----------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.55543   | days                    |       |
| Boiling point                                                  | OPERA QSAR | 210.791   | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 211.454   | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.616548  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.429536  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0353497 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0304088 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 2.63961   | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 8.27942   | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.0000366 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.02537   | no units                |       |

**Isophorone**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 36               | ATSDR. 2018. Toxicological Profile for Isophorone. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                                                                                                                                                                     |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922).                                                                                                                            |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                                                                                                                                   |
| 204              | USEPA. 1989. Chemical Assessment Summary, Isophorone. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, D.C.                                                                                                                                                                                                                              |
| 220              | USEPA. 1992. Isophorone Drinking Water Health Advisory. U.S. Environmental Protection Agency, Office of Water, Washington, D.C.                                                                                                                                                                                                                                                                                                    |
| 234              | USEPA. 1999. Isophorone - Report of the Hazard Identification Assessment Review Committee. U.S. Environmental Protection Agency, Office of Prevention, Pesticides, and Toxic Substances, Office of Pesticides Programs, Health Effects Division, Washington, D.C.                                                                                                                                                                  |

## Isoxaflutole

CCL 5 Contaminant Information Sheet

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                   |
|-----------------|-----------------------------------|
| Name:           | Isoxaflutole                      |
| CASRN:          | 141112-29-0                       |
| DTXSID:         | <a href="#">DTXSID5034723</a>     |
| Use:            | Herbicide; for use on corn fields |
| Chemical Notes: |                                   |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.067                      |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 4       | carcinogen with linear MOA | 7          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect               | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 3                      | liver adenomas and carcinomas | general population | OPP               | 2011                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.1998                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
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**Isoxaflutole**

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**HEALTH EFFECTS DATA**

**Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value  | Units                     | Assessment Source | Critical Study | Critical Effect                                 | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|---------------------------|-------------------|----------------|-------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.02   | mg/kg/day                 | OPP 2011          | Chase 1995     | liver, thyroid, ocular, nervous system toxicity | general population | 33.8                        | 118        | [320]                    |       |
| Cancer Slope Factor (CSF)          | 0.0114 | (mg/kg/day) <sup>-1</sup> | OPP 2011          | Chase 1995     | liver adenomas and carcinomas                   | general population | 33.8                        | 2.60       | [320]                    |       |
| Cancer Classification (CC)         | L      |                           | OPP 2011          |                |                                                 |                    |                             |            | [320]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                | Value   | Units                     | Source                                  | Notes |
|---------------------------------------------|---------|---------------------------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |         |                           |                                         |       |
| Acute Human Health Benchmark                | 0.6     | mg/L                      | EPA HHBP                                |       |
| Acute PAD                                   | 0.02    | mg/kg/day                 | EPA HHBP                                |       |
| Cancer Slope Factor (CSF)                   | 0.0114  | (mg/kg/day) <sup>-1</sup> | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.1     | mg/L                      | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.00281 | mg/L                      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.1     | mg/L                      | Health-based screening levels from USGS |       |
| Health-Based Screening Level                | 0.00281 | mg/L                      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.02    | mg/kg/day                 | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 5000  | mg/kg     | NIH HSDB                        |       |
| LOAEL                                            | 5     | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 500   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 1.79  | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 100   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 3.38  | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0023388 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.62      | no units | TEST QSAR |       |
| Developmental toxin test | 0.897     | no units | TEST QSAR |       |

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,699                         | 22                | Sites              | 1.29                 | 0.0028                  | 0.0257                 | 0.2                       | 0.66                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 322                           | 21                | Sites              | 6.52                 | 0.0028                  | 0.0219                 | 0.141                     | 0.66                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,377                         | 1                 | Sites              | 0.07                 | 0.261                   | 0.261                  | 0.261                     | 0.261                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 35               | 717,004                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                           | 2001 - 2013 | 13                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)          | 2008 - 2017 | 302                           | 2                 | Sites               | 0.66                 | 0.178                   | 0.178                  | 0.178                     | 0.178                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)            | 2008 - 2017 | 528                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)              | 2008 - 2017 | 830                           | 2                 | Sites               | 0.24                 | 0.178                   | 0.178                  | 0.178                     | 0.178                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated) | 2001 - 2013 | 221                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                        | 2001 - 2013 | 216                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                          | 2001 - 2013 | 5                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Arnold et al. 2016 (Filtered) [7]                                      | 2012 - 2013 | 584                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 1.97E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.53704     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 371.042     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 316.595     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000000009 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 5.09E-08    | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0000252   | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0000219   | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 4.99662     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 207.491     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 2.3E-10     | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.47956     | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 320              | USEPA. 2011. Isoxaflutole. Section 3 Registration for Use on Soybeans. Human Health Risk Assessment. EPA-HQ-OPP-2010-0845-0005. DP No. D382796. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                         |



**Lactofen**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Lactofen                      |
| CASRN:          | 77501-63-4                    |
| DTXSID:         | <a href="#">DTXSID7024160</a> |
| Use:            | Herbicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.0046                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 2          | 5         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                          | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 50                     | increased incidence of proteinaceous casts in kidneys and decreases in thyroid and adrenal gland weights | general population | OPP               | 2007                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.2322                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Lactofen

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study      | Critical Effect                                                                                          | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|---------------------|----------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.008 | mg/kg/day | OPP 2007          | Tisdell et al. 1982 | increased incidence of proteinaceous casts in kidneys and decreases in thyroid and adrenal gland weights | general population | 33.8                        | 47.3       | [277]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2007          |                     |                                                                                                          |                    |                             |            | [277]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 0.47  | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.017 | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.05  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.05  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.008 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                      | Value     | Units     | Source                          | Notes |
|---------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |           |           |                                 |       |
| LD50                                              | 5000      | mg/kg     | NIH HSDB                        |       |
| LOAEL                                             | 1.4       | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                             | 150       | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                             | 0.79      | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                             | 50        | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxicant in vitro assays tested | 13.87     | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                  | 73.699997 | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                  | 17        | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0062661 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.466     | no units | TEST QSAR |       |
| Developmental toxin test | 1.012     | no units | TEST QSAR |       |

## Lactofen

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,737                               | 2                    | Sites                 | 0.12                    | 0.101                      | 0.183                     | 0.232                        | 0.265                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 322                                 | 1                    | Sites                 | 0.31                    | 0.101                      | 0.101                     | 0.101                        | 0.101                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,415                               | 1                    | Sites                 | 0.07                    | 0.265                      | 0.265                     | 0.265                        | 0.265                      | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 32               | 785,344                      | 2016 | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) | 1                   | 1,845                         | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                  | 2001 - 2013 | 2                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 304                                 | 2                    | Sites                  | 0.66                    | 0.154                      | 0.163                     | 0.168                        | 0.172                      | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 528                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 832                                 | 2                    | Sites                  | 0.24                    | 0.154                      | 0.163                     | 0.168                        | 0.172                      | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                             | 2012 - 2013 | 584                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water                              | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expocast exposure                                  |      | 0.000000159                                   |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.54533     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 378.705     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 425.323     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 6.62E-08    | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 2.29E-08    | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000000301 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000000822 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 93.5153     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 30.4088     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 1.05E-08    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 4.66713     | no units                |       |

**Lactofen**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 277              | USEPA. 2007. Lactofen: Revised Human Health Risk Assessment for Proposed Uses on Fruiting Vegetables and Okra. EPA-HQ-OPP-2006-0178-0008. DP No. D339011. U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Washington, D.C.                                                                                                                                                            |

## lambda-Cyhalothrin

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                                             |
|-----------------|-------------------------------------------------------------|
| Name:           | lambda-Cyhalothrin                                          |
| CASRN:          | 91465-08-6                                                  |
| DTXSID:         | <a href="#">DTXSID7032559</a>                               |
| Use:            | Insecticide (HSD8 - data for cyhalothrin, CASRN 68085-85-8) |
| Chemical Notes: |                                                             |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 | X |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.024                      |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 6       | reproductive and developmental effects | 2          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect        | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 1                      | reduced motor activity | bottle-fed infants | OPP               | 2017                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0236                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## lambda-Cyhalothrin

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value   | Units     | Assessment Source | Critical Study    | Critical Effect        | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|---------|-----------|-------------------|-------------------|------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.00093 | mg/kg/day | OPP 2017          | Moser et al. 2016 | reduced motor activity | bottle-fed infants | 151                         | 1.23       | [385]                    |       |
| Cancer Classification (CC)         | NL      |           | OPP 2017          |                   |                        |                    |                             |            | [385]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 0.03  | mg/L      | EPA HHBP                                |       |
| Acute Minimal Risk Level (MRL)              | 0.01  | mg/kg/day | CDC ATSDR                               |       |
| Acute Minimal Risk Level (MRL)              | 0.02  | mg/kg/day | CDC ATSDR                               |       |
| Acute PAD                                   | 0.005 | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.006 | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.006 | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.001 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LOAEL                                            | 0.5   | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 5     | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 0.1   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 1.5   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 9.32  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 12.5  | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 2.5   | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0011776 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | -0.114    | no units | TEST QSAR |       |
| Developmental toxin test | 0.956     | no units | TEST QSAR |       |

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Draft Fifth Contaminant Candidate List (CCL 5)  
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OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 3,055                         | 4                 | Sites               | 0.13                 | 0.003                   | 0.0075                 | 0.0236                    | 0.034                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 190                           | 2                 | Sites               | 1.05                 | 0.007                   | 0.0075                 | 0.0078                    | 0.008                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 2,865                         | 2                 | Sites               | 0.07                 | 0.003                   | 0.0185                 | 0.0278                    | 0.034                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 48               | 773,940                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 0                | 0                          | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 7                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 437                           | 1                 | Sites               | 0.23                 | 0.048                   | 0.048                  | 0.048                     | 0.048                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 981                           | 1                 | Sites               | 0.1                  | 0.006                   | 0.006                  | 0.006                     | 0.006                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 1,417                         | 2                 | Sites               | 0.14                 | 0.006                   | 0.027                  | 0.0396                    | 0.048                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 118                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 111                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 7                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 4,815                         | 237               | Sites               | 4.92                 | 7e-04                   | 0.00511                | 0.0222                    | 0.447                   | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 8                 | Sites               | 21                   | 9.23e-05                | 0.000314               | 0.0018                    | 0.0022                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 106                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.00000189                              |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.54201     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 422.672     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 431.019     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 4.02E-09    | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 2.05E-09    | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 1.97E-08    | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.000000071 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 133.673     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 342.768     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000000012 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 6.63514     | no units                |       |

**lambda-Cyhalothrin**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 385              | USEPA. 2017. Lambda- & Gamma-Cyhalothrin: Human Health Draft Risk Assessment for Registration Review. EPA-HQ-OPP-2010-0480-0299. DP No. 426321. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                         |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |



**Lidocaine**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Lidocaine                     |
| CASRN:          | 137-58-6                      |
| DTXSID:         | <a href="#">DTXSID1045166</a> |
| Use:            | Anesthetic                    |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 | X |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.004                      |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects | 10         | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                          | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 8                      | lowest therapeutic dose:local anesthesia | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0318                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Lidocaine

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value   | Units     | Assessment Source  | Critical Study          | Critical Effect                          | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                 |
|------------------------------------|---------|-----------|--------------------|-------------------------|------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.00125 | mg/kg/day | FDA 2018; NIH 2018 | Fresenius Kabi USA, LLC | lowest therapeutic dose:local anesthesia | bottle-fed infants | 151                         | 8.30                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 0.00125 | mg/kg/day | FDA 2018; NIH 2018 | Fresenius Kabi USA, LLC | lowest therapeutic dose:local anesthesia | general population | 33.8                        | 29.0                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                            | Value       | Units | Source              | Notes |
|---------------------------------------------------------|-------------|-------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |       |                     |       |
| Screening level for pharmaceutical - general population | 0.029411765 | mg/L  | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.008333333 | mg/L  | EPA Office of Water |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 220   | mg/kg   | NIH HSDB                | min   |
| LD50                                             | 317   | mg/kg   | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 4.68  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0073961 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.073     | no units | TEST QSAR |       |
| Developmental toxin test | 0.277     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 557                           | 136               | Sites              | 24                   | 0.00038                 | 0.00289                | 0.0318                    | 0.438                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 75                            | 39                | Sites              | 52                   | 0.00038                 | 0.00356                | 0.0688                    | 0.438                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 482                           | 97                | Sites              | 20                   | 0.00038                 | 0.00262                | 0.0132                    | 0.0508                  | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Bradley et al. 2018 (Finished) [53]                           | 2016        | 26                            | 1                 | Sites               | 3.85                 | 0.0237378               | 0.0237                 | 0.0237                    | 0.0237378               | ug/L        |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 209                           | 97                | Sites               | 46                   | 0.00042                 | 0.00813                | 0.175                     | 0.438                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 401                           | 35                | Sites               | 8.73                 | 0.00058                 | 0.00496                | 0.0769                    | 0.505                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 610                           | 132               | Sites               | 22                   | 0.00042                 | 0.0069                 | 0.154                     | 0.505                   | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                            | NA                | Sites               | 8                    |                         | 0.0296                 |                           | 0.0297                  | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                            | 21                | Sites               | 55                   | 0.0009345               | 0.0841                 | 0.248                     | 0.4088204               | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                       | 2013 - 2015 | 1,106                         | 2                 | Sites               | 0.18                 | 0.0276506               | 0.0336                 | 0.0384                    | 0.0396035               | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                            | 19                | Sites               | 90                   | 0.0863121               | 0.321                  | 0.586                     | 2.6986356               | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 3.11E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|----------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.35565    | days                    |       |
| Boiling point                                                  | OPERA QSAR | 308.77     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 323.774    | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 7.96E-08   | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.00000094 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0095648  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00334965 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 15.25      | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 11.885     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 3.51E-10   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.4589     | no units                |       |

**Lidocaine**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                  |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. <i>Environmental Science and Technology</i> 53: 2950-2960.                                                                                                            |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985. |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                                                                                  |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922).                                                         |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                                                                                             |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                                                                |

**Linuron**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Linuron                       |
| CASRN:          | 330-55-2                      |
| DTXSID:         | <a href="#">DTXSID2024163</a> |
| Use:            | Herbicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.0032                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect       | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 50                     | hematological changes | general population | OPP               | 2019                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.1589                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Linuron

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study | Critical Effect       | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|----------------|-----------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0077 | mg/kg/day | OPP 2019          | Malley 1988    | hematological changes | general population | 33.8                        | 45.6       | [418]                    |       |
| Cancer Classification (CC)         | C      |           | OPP 2019          |                |                       |                    |                             |            | [418]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value  | Units     | Source                                  | Notes |
|---------------------------------------------|--------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |        |           |                                         |       |
| Acute Human Health Benchmark                | 3.3    | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.12   | mg/kg/day | EPA HHBP                                |       |
| Chronic Health-Based Guidance Value         | 0.001  | mg/L      | MN DOH                                  |       |
| Chronic Human Health Benchmark              | 0.049  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.049  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.0077 | mg/kg/day | EPA HHBP                                |       |

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 4000  | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 500   | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 261   | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 3.49  | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 0.79  | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 63    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 10.35 | percent   | EPA Chemistry Dashboard         |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0056494 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.605     | no units | TEST QSAR |       |
| Developmental toxin test | 0.569     | no units | TEST QSAR |       |

#### Nationally Representative Water Data

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 39               | 506,914                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 4                | 10                         | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

## Non-Nationally Representative Water Data

| Non-Storing Data                                                                       |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| <b>Finished Water</b>                                                                  |             |                               | Prevalence        |                     |                      |                         | Magnitude              |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 3                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 3                 | Sites               | 18                   | 0.0027                  | 0.0075                 | 0.164                     | 0.315                   | ug/L        |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               | Prevalence        |                     |                      |                         | Magnitude              |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 41                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 624                           | 13                | Sites               | 2.08                 | 0.00218                 | 0.00683                | 0.174                     | 0.246                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 1,623                         | 3                 | Sites               | 0.18                 | 0.003                   | 0.071                  | 0.0956                    | 0.111                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 2,247                         | 16                | Sites               | 0.71                 | 0.00218                 | 0.0113                 | 0.111                     | 0.246                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 2                 | Sites               | 0.87                 | 0.0042                  | 0.00835                | 0.0166                    | 0.019                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 2                 | Sites               | 17                   | 0.0042                  | 0.00835                | 0.0166                    | 0.019                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 6,817                         | 178               | Sites               | 2.61                 | 0.0031                  | 0.0148                 | 0.573                     | 5.6                     | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 2                 | Sites               | 5.26                 | 0.02                    | 0.03                   | 0.038                     | 0.04                    | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 8                 | Sites               | 1.16                 | 3e-04                   | 0.00095                | 0.00163                   | 0.0017                  | ug/L        |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               | Prevalence        |                     |                      |                         | Magnitude              |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| ExpoCast exposure                                  |      | 1.47E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UICMR 4 data used in the draft CCI 5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.52572     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 323.038     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 304.222     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.00000285  | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.000000679 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000410555 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000829851 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 19.518      | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  |             |                         |       |
| Henry's Law constant                                              | OPERA QSAR | 7.35E-10    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 3.05317     | no units                |       |

**Linuron**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 418              | USEPA. 2019. Linuron: Revised Human Health Draft Risk Assessment to Support Registration Review. EPA-HQ-OPP-2010-0228-0065. DP No. D444117. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                             |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |



**Lithium**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                        |                                                                                                                            |
|------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>Name:</b>           | Lithium                                                                                                                    |
| <b>CASRN:</b>          | 7439-93-2                                                                                                                  |
| <b>DTXSID:</b>         | <a href="#">DTXSID5036761</a>                                                                                              |
| <b>Use:</b>            | Metal, pharmaceutical. Used as Anode in electrochemical cells and batteries; as chemical intermediate in organic syntheses |
| <b>Chemical Notes:</b> |                                                                                                                            |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                                 |                                   |
|---------------------------------|-----------------------------------|
| <b>Draft CCL5 List Decision</b> | <b>Final Hazard Quotient (HQ)</b> |
| List                            | 6.3                               |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 3       | non-cancer effects | 10         | 9         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 10                     | renal, neurologic, and endocrine gland effects | general population | PPRTV             | 2008                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 63                           | 90th Percentile                               | Finished Water                       | NIRS   | 1984-1986 |

**PUBLIC NOMINATION STATUS**

|                          |
|--------------------------|
| <b>Public Nomination</b> |
|                          |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Lithium

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study               | Critical Effect                                | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|------------------------------|------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 2     | ug/kg/day | PPRTV 2008        | Baldessarini and Tarazi 2001 | renal, neurologic, and endocrine gland effects | general population | 33.8                        | 11.8       | [295]                    |       |
| Cancer Classification (CC)         | I     |           | PPRTV 2008        |                              |                                                |                    |                             |            | [295]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects                                                                            | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study           | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|--------------------------------------------------------------------------------------------------------|-----------------------------|------------------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Reproductive, Cardiovascular, Hepatic, Neurological, Developmental, Renal, Systemic, Immune, Metabolic | 15                          | Ahmad, 2011; Abu-Taweel 2012 | Neurological                 | 29.94                        | Riadh, 2011         | 2007-06-01           | 2019-10-21         | 5278                                           | 46                                              | 189                                            | 5                                                 |

## Other Health Data

| Data Element                                | Value | Units     | Source    | Notes |
|---------------------------------------------|-------|-----------|-----------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |           |       |
| Subchronic Provisional RfD                  | 0.002 | mg/kg/day | EPA PPRTV |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units | Source   | Notes |
|---------------------------------------------|-------|-------|----------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |          |       |
| LD50                                        | 1165  | mg/kg | NIH HSDB | max   |
| LD50                                        | 526   | mg/kg | NIH HSDB | min   |

| Data Element             | Value | Units | Source    | Notes |
|--------------------------|-------|-------|-----------|-------|
| <b>Modeled Data</b>      |       |       |           |       |
| LD50                     |       |       | TEST QSAR |       |
| Ames mutagenicity test   |       |       | TEST QSAR |       |
| Developmental toxin test |       |       | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Lithium  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 | 988                           | 551               | Sites              | 56                   | 5                       | 15                     | 63                        | 7929                    | ug/L        |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 5,983                         | 5,683             | Sites              | 95                   | 0.15                    | 4.51                   | 43.9                      | 2420                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 271                           | 213               | Sites              | 79                   | 0.15                    | 4.39                   | 43.5                      | 460                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 5,712                         | 5,470             | Sites              | 96                   | 0.15                    | 4.66                   | 44.7                      | 2420                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) | 1M - 10M                     |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 7                             | 7                 | Sites               | 100                  | 0.003                   | 3.3                    | 5.2                       | 16                      | ug/L        |       |
| Bradley et al. 2018 (Finished) [53]                           | 2016        | 26                            | 23                | Sites               | 88                   | 0.35                    | 1.95                   | 13.6                      | 71.05                   | ug/L        |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                            | NA                | Sites               | 56                   |                         | 10.8                   |                           | 42.7                    | ug/L        |       |
| Community Water System Survey (CWSS) (Finished) [178]         | 2006        | 1                             | NA                | Sites               |                      |                         | 2.7                    | 2.7                       |                         | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 21                            | 10                | Sites               | 48                   | 0.002                   | 2.8                    | 9.7                       | 40                      | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 1,324                         | 1,159             | Sites               | 88                   | 0                       | 4.5                    | 43.5                      | 70400                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 5,801                         | 5,648             | Sites               | 97                   | 0.07                    | 15.3                   | 100                       | 80600                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 7,115                         | 6,797             | Sites               | 96                   | 0                       | 9.46                   | 73.4                      | 80600                   | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                            | NA                | Sites               | 56                   |                         | 10.7                   |                           | 46                      | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                             | 2012 - 2013 | 757                           | 729               | Sites               | 96                   | 0.22                    | 5.39                   | 39.6                      | 285                     | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                              | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| ExpoCast exposure                                  |      |                                         |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

**Lithium**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. Environmental science & technology, 52(23), 13972-13985.                                                                                |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. Science of The Total Environment. v581-582, (909-922).                                                                                                                                    |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                                                                                                                                                              |
| 295              | USEPA. 2008. Provisional Peer Reviewed Toxicity Values for Lithium (CASRN 7439-93-2). EPA/690/R-08/016F. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH.                                                                                                                                   |

**Loratadine**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Loratadine                    |
| CASRN:          | 79794-75-5                    |
| DTXSID:         | <a href="#">DTXSID2023224</a> |
| Use:            | antihistaminic                |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.0057                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 8       | non-cancer effects | 6          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                                                          | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 0.3                    | lowest therapeutic dose: Antihistamine/relieves of symptoms due to hay fever or other upper respiratory allergies such as runny nose, itchy, watery eyes | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0017                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value       | Units     | Assessment Source  | Critical Study       | Critical Effect                                                                                                                                         | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                 |
|------------------------------------|-------------|-----------|--------------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 4.16667E-05 | mg/kg/day | FDA 2018; NIH 2018 | Bayer HealthCare LLC | lowest therapeutic dose:Antihistamine/relieves of symptoms due to hay fever or other upper respiratory allergies such as runny nose, itchy, watery eyes | bottle-fed infants | 151                         | 0.280                      | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 4.16667E-05 | mg/kg/day | FDA 2018; NIH 2018 | Bayer HealthCare LLC | lowest therapeutic dose:Antihistamine/relieves of symptoms due to hay fever or other upper respiratory allergies such as runny nose, itchy, watery eyes | general population | 33.8                        | 0.980                      | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                            | Value       | Units     | Source              | Notes |
|---------------------------------------------------------|-------------|-----------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |           |                     |       |
| Maximum Recommended Daily Dose                          | 0.167       | mg/kg/day | FDA                 |       |
| Screening level for pharmaceutical - general population | 0.000980392 | mg/L      | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.000277778 | mg/L      | EPA Office of Water |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 5000  | mg/kg   | NIH HSDB                |       |
| Percent of active toxcast in vitro assays tested | 37    | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0011588 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | -0.082    | no units | TEST QSAR |       |
| Developmental toxin test | 0.8       | no units | TEST QSAR |       |

## Loratadine

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 557                                 | 4                    | Sites                  | 0.72                    | 0.00022                    | 0.00059                   | 0.0017                       | 0.00279                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 75                                  | 3                    | Sites                  | 4                       | 0.00034                    | 6e-04                     | 0.00192                      | 0.00279                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 482                                 | 1                    | Sites                  | 0.21                    | 0.00022                    | 0.00022                   | 0.00022                      | 0.00022                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                                  | NA                   | Sites                  | 0                       |                            |                           |                              |                            | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 205                                 | 10                   | Sites                  | 4.88                    | 0.00016                    | 0.00154                   | 0.0134                       | 0.151                      | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 401                                 | 1                    | Sites                  | 0.25                    | 0.00097                    | 0.00097                   | 0.00097                      | 0.00097                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 606                                 | 11                   | Sites                  | 1.82                    | 0.00016                    | 0.00142                   | 0.0134                       | 0.151                      | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                                  | NA                   | Sites                  | 0                       |                            |                           |                              |                            | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                                  | 6                    | Sites                  | 16                      | 0.0007989                  | 0.00138                   | 0.00211                      | 0.0022605                  | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                       | 2013 - 2015 | 1,106                               | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                                  | 12                   | Sites                  | 57                      | 0.0016315                  | 0.0026                    | 0.0153                       | 0.0638996                  | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                       | <b>Value</b>         | <b>Units</b>           | <b>Model</b>            | <b>Notes</b>               |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expcast exposure                                   |      | 0.000000259                                   |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.35836     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 365.058     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 474.912     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 3.83E-10    | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 2.27E-10    | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.00000725  | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0000128   | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 124.017     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 28.6418     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.000000016 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 4.96583     | no units                |       |

**Loratadine**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                  |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. Environmental Science and Technology 53: 2950-2960.                                                   |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. Environmental science & technology, 51(9), 4792-4802.            |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                  |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. Science of The Total Environment. v581-582, (909-922). |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                             |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. Science of the Total Environment, 636, 69-79.        |



**Magnesium**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                              |
|-----------------|----------------------------------------------|
| Name:           | Magnesium                                    |
| CASRN:          | 7439-95-4                                    |
| DTXSID:         | <a href="#">DTXSID0049658</a>                |
| Use:            | Metal, used in alloys commonly with aluminum |
| Chemical Notes: |                                              |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 5.1                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 3       | non-cancer effects | 10         | 10        |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                          | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 7000                   | "mild diarrhea and other mild gastrointestinal complaints" -- reversible | bottle-fed infants | IOM               | 1997                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 35511                        | 90th Percentile                               | Finished Water                       | NIRS   | 1984-1986 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**Magnesium**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element                       | Value | Units     | Assessment Source | Critical Study      | Critical Effect                                          | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                             |
|------------------------------------|-------|-----------|-------------------|---------------------|----------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------|
| Reference Dose (RfD) or Equivalent | 5     | mg/kg/day | IOM 1997          | Bashir et al., 1993 | mild diarrhea and other mild gastrointestinal complaints | bottle-fed infants | 151                         | 6620                       | [107]                    | NOTE: this compound is a nutrient |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

| Data Element             | Value | Units | Source    | Notes |
|--------------------------|-------|-------|-----------|-------|
| <b>Modeled Data</b>      |       |       |           |       |
| LD50                     |       |       | TEST QSAR |       |
| Ames mutagenicity test   |       |       | TEST QSAR |       |
| Developmental toxin test |       |       | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
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EPA - Office of Water

Magnesium  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 | 988                           | 976               | Sites              | 99                   | 50                      | 9948                   | 35511                     | 115887                  | ug/L        |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 12,121                        | 12,118            | Sites              | 100                  | 5                       | 9630                   | 32300                     | 2.00E+06                | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,620                         | 2,620             | Sites              | 100                  | 41                      | 8760                   | 29100                     | 2.00E+06                | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9,502                         | 9,499             | Sites              | 100                  | 5                       | 12700                  | 40100                     | 1800000                 | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) | 250M - 500M                  |

Non-Scoring Data

| Non-Nationally Representative Water Data              | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|-------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                 |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                       |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)        | 2006 - 2020 | 621                           | 598               | Sites               | 96                   | 57                      | 14600                  | 32000                     | 1400000                 | ug/L        |       |
| Drinking Water Monitoring Data - MA (Finished)        | 2006 - 2020 | 542                           | 521               | Sites               | 96                   | 10                      | 3500                   | 8500                      | 70000                   | ug/L        |       |
| Drinking Water Monitoring Data - WA (Finished)        | 2006 - 2011 | 206                           | 201               | Sites               | 98                   | 100                     | 8000                   | 19720                     | 49500                   | ug/L        |       |
| Glassmeyer et al 2017 (Finished) [86]                 | 2007 - 2012 | 25                            | NA                | Sites               | 100                  |                         | 8810                   |                           | 31700                   | ug/L        |       |
| Community Water System Survey (CWSS) (Finished) [178] | 2006        | 12                            | NA                | Sites               |                      |                         | 9950                   | 24000                     |                         | ug/L        |       |
| <b>Ambient Water</b>                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                       |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)          | 2006 - 2020 | 5,422                         | 5,288             | Sites               | 98                   | 3                       | 14000                  | 47000                     | 7.1e+07                 | ug/L        |       |
| Drinking Water Monitoring Data - MA (Source)          | 2006 - 2020 | 81                            | 81                | Sites               | 100                  | 400                     | 4400                   | 8000                      | 55400                   | ug/L        |       |
| Drinking Water Monitoring Data - PA (Source)          | 2006 - 2011 | 3                             | 3                 | Sites               | 100                  | 2600                    | 14800                  | 19530                     | 19600                   | ug/L        |       |
| Drinking Water Monitoring Data - WA (Source)          | 2006 - 2011 | 308                           | 304               | Sites               | 99                   | 120                     | 10850                  | 25710                     | 59500                   | ug/L        |       |
| Drinking Water Monitoring Data - WI (Source)          | 2012-2019   | 141                           | 140               | Sites               | 99                   | 160                     | 23000                  | 43700                     | 77300                   | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                  | 2007 - 2012 | 25                            | NA                | Sites               | 100                  |                         | 10600                  |                           | 44600                   | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                     | 2012 - 2013 | 758                           | 757               | Sites               | 100                  | 13                      | 5840                   | 35440                     | 133000                  | ug/L        |       |
| <b>Waste Water Effluent</b>                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                       |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
|                                                       |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                       |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                       |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                      | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                       |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| ExpoCast exposure                                  |      |                                         |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

**Magnesium**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. Science of The Total Environment. v581-582, (909-922).                                                                                                                                    |
| 107              | IOM. 1997. Standing Committee on the Scientific Evaluation of Dietary Reference Intakes, Food and Nutrition Board. Dietary Reference Intakes for calcium, phosphorus, magnesium, vitamin D, and fluoride. Institute of Medicine (IOM), National Academy Press, Washington, DC.                                                                                                                                                     |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                                                                                                                                                              |

**Malathion**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                  |
|-----------------|----------------------------------|
| Name:           | Malathion                        |
| CASRN:          | 121-75-5                         |
| DTXSID:         | <a href="#">DTXSID4020791</a>    |
| Use:            | Insecticide; veterinary medicine |
| Chemical Notes: |                                  |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.0078                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 5       | reproductive and developmental effects | 9          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                           | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 10                     | inhibition of red blood cell acetylcholinesterase in pups | bottle-fed infants | OPP               | 2016                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.078                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Malathion

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study                   | Critical Effect                                           | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------------------------|-----------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.01  | mg/kg/day | OPP 2016          | Fulcher 2001; Barnett 2006, 2008 | inhibition of red blood cell acetylcholinesterase in pups | bottle-fed infants | 151                         | 13.2       | [368]                    |       |
| Cancer Classification (CC)         | S     |           | OPP 2016          |                                  |                                                           |                    |                             |            | [368]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                     | Value          | Units             | Source                             | Notes |
|--------------------------------------------------|----------------|-------------------|------------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |                |                   |                                    |       |
| 10-day Health Advisory                           | 0.2            | mg/L              | EPA DWSHA 2018                     |       |
| Acute Inhalation Minimal Risk Level (MRL)        | 0.2            | mg/m <sup>3</sup> | CDC ATSDR                          |       |
| Intermediate Inhalation Minimal Risk Level (MRL) | 0.02           | mg/m <sup>3</sup> | CDC ATSDR                          |       |
| Intermediate Minimal Risk Level (MRL)            | 0.02           | mg/kg/day         | CDC ATSDR                          |       |
| Lifetime Health Advisory                         | 0.5            | mg/L              | EPA DWSHA 2018                     |       |
| Maximum Allowable Concentration (MAC)            | 0.19           | mg/L              | Canadian Drinking Water Guidelines |       |
| Cancer Classification (CC)                       | 2A             | no units          | WHO IARC                           |       |
| Cancer Classification (CC)                       | Female.Mice N  | no units          | HHS NTP                            |       |
| Cancer Classification (CC)                       | Female.Mice NT | no units          | HHS NTP                            |       |
| Cancer Classification (CC)                       | Female.Rats N  | no units          | HHS NTP                            |       |
| Cancer Classification (CC)                       | Female.Rats NT | no units          | HHS NTP                            |       |
| Cancer Classification (CC)                       | Male.Mice N    | no units          | HHS NTP                            |       |
| Cancer Classification (CC)                       | Male.Mice NT   | no units          | HHS NTP                            |       |
| Cancer Classification (CC)                       | Male.Rats N    | no units          | HHS NTP                            |       |
| Cancer Classification (CC)                       | Male.Rats NT   | no units          | HHS NTP                            |       |

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 190   | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 5843  | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 1476  | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 29    | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 451   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 5     | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 12.14 | percent   | EPA Chemistry Dashboard         |       |
| TD50                                             | 44700 | mg/kg/day | NIH CPDB                        | max   |
| TD50                                             | 66.6  | mg/kg/day | NIH CPDB                        | min   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0010471 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.383     | no units | TEST QSAR |       |
| Developmental toxin test | 0.378     | no units | TEST QSAR |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

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| Scoring Data                                                   |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|--|
| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |  |
| <b>Finished Water</b>                                          |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |  |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |
| <b>Ambient Water</b>                                           |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |  |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 11,237                        | 416               | Sites              | 3.7                  | 0.00041                 | 0.014                  | 0.078                     | 9.58                    | ug/L        |       |  |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,230                         | 383               | Sites              | 17                   | 0.00041                 | 0.014                  | 0.078                     | 9.58                    | ug/L        |       |  |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9,008                         | 33                | Sites              | 0.37                 | 0.00107                 | 0.006                  | 0.0248                    | 0.239                   | ug/L        |       |  |

| Pesticide Application Data                         |  | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 |  | Number of States | Amount Released (lbs/year) | Chemical Production Data                           |  | Production Volume (lbs/year) |
|----------------------------------------------------|--|------------------|---------------------------|------|----------------------------------------------------|--|------------------|----------------------------|----------------------------------------------------|--|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |  | 33               | 1,346,697                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |  | 10               | 108,619                    | Chemical Data Reporting (CDR) Results (EPA) (2016) |  |                              |

| Non-Scoring Data                                                                       |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|----------------------------------------------------------------------------------------|--|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Non-Nationally Representative Water Data                                               |  | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| Finished Water                                                                         |  |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         |  | 2006 - 2020 | 3                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WA (Finished)                                         |  | 2006 - 2011 | 481                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           |  | 2001 - 2013 | 17                            | 2                 | Sites               | 12                   | 0.01                    | 0.063                  | 0.254                     | 0.331                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          |  | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Ambient Water                                                                          |  |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           |  | 2006 - 2020 | 37                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WA (Source)                                           |  | 2006 - 2011 | 634                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          |  | 2008 - 2017 | 1,003                         | 50                | Sites               | 4.99                 | 6.00E - 04              | 0.022                  | 0.418                     | 5.46                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            |  | 2008 - 2017 | 3,060                         | 3                 | Sites               | 0.1                  | 0.01                    | 0.108                  | 0.159                     | 0.181                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              |  | 2008 - 2017 | 4,062                         | 53                | Sites               | 1.3                  | 6.00E - 04              | 0.0223                 | 0.401                     | 5.46                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 |  | 2001 - 2013 | 229                           | 4                 | Sites               | 1.75                 | 0.00999                 | 0.0763                 | 0.269                     | 0.312                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        |  | 2001 - 2013 | 219                           | 3                 | Sites               | 1.37                 | 0.05                    | 0.103                  | 0.278                     | 0.312                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          |  | 2001 - 2013 | 12                            | 1                 | Sites               | 8.33                 | 0.00999                 | 0.00999                | 0.00999                   | 0.00999                 | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] |  | 1990 - 2018 | 15,764                        | 712               | Sites               | 4.52                 | 0.006                   | 0.089                  | 0.848                     | 46                      | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     |  | 2012 - 2014 | 38                            | 3                 | Sites               | 7.89                 | 0.0166                  | 0.0374                 | 0.0518                    | 0.0554                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      |  | 2012 - 2013 | 690                           | 3                 | Sites               | 0.43                 | 0.0011                  | 0.0017                 | 0.0891                    | 0.111                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           |  | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                                     |  | 2002 - 2010 | 133                           | 3                 | Samples             | 2.3                  |                         |                        |                           | 0.04                    | ug/L        |       |
| Waste Water Effluent                                                                   |  |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
|                                                                                        |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       |  | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| ExpoCast exposure                                  |      | 0.00000153                              |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units       | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 25.141      | days        |       |
| Boiling point                                                     | OPERA QSAR | 359.971     | degree C    |       |
| Boiling point                                                     | TEST QSAR  | 284.068     | degree C    |       |
| Vapor pressure                                                    | OPERA QSAR | 0.00000395  | mmHg        |       |
| Vapor pressure                                                    | TEST QSAR  | 0.00000723  | mmHg        |       |
| Solubility in water                                               | OPERA QSAR | 0.000634727 | mol/L       |       |
| Solubility in water                                               | TEST QSAR  | 0.000760326 | mol/L       |       |
| Bioconcentration factor                                           | OPERA QSAR | 26.329      | no units    |       |
| Bioconcentration factor                                           | TEST QSAR  | 9.86279     | no units    |       |
| Henry's Law constant                                              | OPERA QSAR | 3.85E-09    | atm-m^3/mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 2.24648     | no units    |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 368              | USEPA. 2016. Malathion: Human Health Draft Risk Assessment for Registration Review. EPA-HQ-OPP-2009-0317-0080. DP No. D414107. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                          |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |



## Manganese

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                                                                                                                                                                       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name:           | Manganese                                                                                                                                                                             |
| CASRN:          | 7439-96-5                                                                                                                                                                             |
| DTXSID:         | <a href="#">DTXSID2024169</a>                                                                                                                                                         |
| Use:            | Manufacturing of steel alloys, in dry-cell batteries, electrical coils, ceramics, matches, glass, dyes, fertilizers, welding rods, as oxidizing agents, and as animal food additives. |
| Chemical Notes: |                                                                                                                                                                                       |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             |   |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              | X |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 | X |

## CONTAMINANT SUMMARY &amp; DECISION

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| List                     | 0.97                       |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 5       | reproductive and developmental effects | 10         | 7         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                                                                                                                                                                             | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 30                     | various neurological endpoints in rats including behavioral and sensorimotor effects, corresponding neurostructural and neurochemical changes, persistent later-life consequences of developmental exposures after levels of manganese in the brain have returned to normal | bottle-fed infants | HC                | 2019                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date        |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-------------|
| 29.2                         | 90th Percentile                               | Finished Water                       | UCMR4  | 2018 - 2019 |

## PUBLIC NOMINATION STATUS

|                   |
|-------------------|
| Public Nomination |
| X                 |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     |       |       | X     |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | RD 2           | RD 3           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Not Applicable | Not Applicable |
| Basis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                |
| Manganese is a naturally occurring element and an essential nutrient of which ingestion is not known to present adverse health effects at low levels [a]. Drinking water contributes only a small portion of normal oral intake, contributing to approximately $2.8 \times 10^{-4}$ mg/kg-day of daily manganese exposure (calculated using the median concentration of detections of NIRS data (0.012 mg/L), and assuming a daily intake of 2 L of drinking water by a 70 kg adult for a calculated exposure ) [b,c]. It is unlikely that regulation of manganese in drinking water would represent a meaningful opportunity for health risk reduction in persons served by public water systems. |                |                |
| [a] USEPA, 2003 [257]; [b] IOM, 2001 [106]; [c] NIRS, 2016 [151]; as cited in USEPA, 2001 [180]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                |                |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**Manganese**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units     | Assessment Source | Critical Study                                  | Critical Effect                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Target Population  | Exposure Factor (mg/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.025 | mg/kg/day | HC 2019           | Kern et al., 2010, 2011; Beaudin et al., 2013   | various neurological endpoints in rats. "In addition to demonstrating that exposure to manganese in early life can result in behavioural and sensorimotor effects, these studies provided mechanistic support by demonstrating corresponding neurostructural and neurochemical changes. Further, Kern et al. (2011) and Beaudin et al. (2013) demonstrated the ability of manganese exposure in early life to result in effects that persist into adulthood, after levels of manganese in the brain have returned to normal." | bottle-fed infants | 151                         | 33.1       | [101]                    |       |
| Reference Dose (RfD) or Equivalent | 0.14  | mg/kg/day | IRIS 1988         | NRC 1989; Freeland-Graves et al. 1987; WHO 1973 | "CNS effects"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | general population | 33.8                        | 828        | [199]                    |       |
| Reference Dose (RfD) or Equivalent | 0.14  | mg/kg/day | OW 2004           | NRC 1989; WHO 1973; Schroeder et al. 1966       | "NOAEL for chronic ingestion of manganese by humans"                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | general population | 33.8                        | 828        | [260]                    |       |
| Cancer Classification (CC)         | D     |           | IRIS 1988         |                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                             |            | [199]                    |       |
| Cancer Classification (CC)         | D     |           | OW 2004           |                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                             |            | [260]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mg/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Reproductive                | 0.01                        | Souza, 2019        | Developmental                | 11                           | Foster, 2018        | 2018-05-01           | 2019-10-25         | 1413                                           | 13                                              | 91                                             | 3                                                 |

**Other Health Data**

| Data Element                                | Value   | Units             | Source                            | Notes |
|---------------------------------------------|---------|-------------------|-----------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |         |                   |                                   |       |
| 10-day Health Advisory                      | 1       | mg/L              | EPA DWSHA 2018                    |       |
| Chronic Health-Based Guidance Value         | 0.1     | mg/L              | MN DOH                            |       |
| Human Health Ambient Water Quality Criteria | 0.05    | mg/L              | EPA Human Health Criteria for CWA |       |
| Lifetime Health Advisory                    | 0.3     | mg/L              | EPA DWSHA 2018                    |       |
| Reference Concentration (RfC)               | 0.09    | ug/m <sup>3</sup> | CalEPA OEHHA Chemical Database    |       |
| Reference Concentration (RfC)               | 0.00005 | mg/m <sup>3</sup> | EPA IRIS                          |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

| Data Element             | Value | Units | Source    | Notes |
|--------------------------|-------|-------|-----------|-------|
| <b>Modeled Data</b>      |       |       |           |       |
| LD50                     |       |       | TEST QSAR |       |
| Ames mutagenicity test   |       |       | TEST QSAR |       |
| Developmental toxin test |       |       | TEST QSAR |       |

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 | 3,743                         | 3,293             | Sites              | 88                   | 0.4                     | 2.76                   | 29.2                      | 3960                    | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 | 799                           | 668               | Sites              | 84                   | 1                       | 5.5                    | 57                        | 3550                    | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 | 989                           | 672               | Sites              | 68                   | 1                       | 12                     | 126                       | 1341                    | ug/L        |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 11,988                        | 10,113            | Sites              | 84                   | 0.05                    | 18                     | 195                       | 59000                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,538                         | 2,439             | Sites              | 96                   | 0.1                     | 18.4                   | 122                       | 12000                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9,451                         | 7,674             | Sites              | 81                   | 0.05                    | 17                     | 440                       | 59000                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) | 47               | 31,505,117                 | Chemical Data Reporting (CDR) Results (EPA) (2016) | 250M - 500M                  |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 926                           | 562               | Sites              | 61                   | 0.002                   | 28                     | 190                       | 93300                   | ug/L        |       |
| Drinking Water Monitoring Data - MA (Finished)                | 2006 - 2020 | 1,665                         | 1,305             | Sites              | 78                   | 0.38                    | 59                     | 475                       | 159000                  | ug/L        |       |
| Drinking Water Monitoring Data - WA (Finished)                | 2006 - 2011 | 998                           | 519               | Sites              | 52                   | 0.6                     | 30                     | 210                       | 6700                    | ug/L        |       |
| Bradley et al. 2018 (Finished) [53]                           | 2016        | 26                            | 22                | Sites              | 85                   | 0.55                    | 1.84                   | 13.8                      | 44.47                   | ug/L        |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                            | NA                | Sites              | 64                   |                         | 2.6                    |                           | 55.6                    | ug/L        |       |
| Community Water System Survey (CWSS) (Finished) [178]         | 2006        | 1                             | NA                | Sites              |                      |                         | 0.003                  | 0.003                     |                         | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 5,546                         | 2,858             | Sites              | 52                   | 0.003                   | 87                     | 510                       | 36000                   | ug/L        |       |
| Drinking Water Monitoring Data - FL (Source)                  | 2006 - 2011 | 35                            | 29                | Sites              | 83                   | 0.3                     | 6.4                    | 42                        | 90                      | ug/L        |       |
| Drinking Water Monitoring Data - MA (Source)                  | 2006 - 2020 | 407                           | 362               | Sites              | 89                   | 0.93                    | 182                    | 1180                      | 11000                   | ug/L        |       |
| Drinking Water Monitoring Data - PA (Source)                  | 2006 - 2011 | 52                            | 45                | Sites              | 87                   | 0.04                    | 70                     | 374                       | 1500                    | ug/L        |       |
| Drinking Water Monitoring Data - WA (Source)                  | 2006 - 2011 | 1,560                         | 804               | Sites              | 52                   | 0.6                     | 50                     | 240                       | 9150                    | ug/L        |       |
| Drinking Water Monitoring Data - WI (Source)                  | 2012-2019   | 145                           | 124               | Sites              | 86                   | 0.516                   | 25                     | 140                       | 10600                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 3,519                         | 3,463             | Sites              | 98                   | 0.04                    | 30                     | 231                       | 357000                  | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 11,832                        | 9,545             | Sites              | 81                   | 0.019                   | 19.9                   | 641                       | 680000                  | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 15,319                        | 12,981            | Sites              | 85                   | 0.019                   | 28.8                   | 316                       | 680000                  | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                            | NA                | Sites              | 92                   |                         | 43                     |                           | 1497                    | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                             | 2012 - 2013 | 757                           | 653               | Sites              | 86                   | 0.15                    | 8.06                   | 175                       | 3110                    | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                              | Date        | Source                        | Value             | Units              | Model                | Notes                   |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                   |      |                                         |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) | 14.8                         | ug/l  |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

**Manganese**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> .                                                                                                                                                                |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985.                                                                                                                                                                                                                                   |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922).                                                                                                                                                                                                                                                                                           |
| 101              | Health Canada. 2019. Guideline Technical Document Manganese. Health Canada (HC), Ottawa, Ontario, Canada.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 106              | Institute of Medicine (IOM). 2001. Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium and Zinc: A Report of the Panel on Micronutrients, Subcommittees on Upper Reference Levels of Nutrients and of Interpretation and Use of Dietary Reference Intakes, and the Standing Committee on the Scientific Evaluation of Dietary Reference Intakes, Food and Nutrition Board, Institute of Medicine. Washington, DC: National Academy Press (prepublication version). Available on the Internet at: |
| 151              | NIRS. 2016. Summary of data provided in tabular form in docket; <a href="http://www.regulations.gov">www.regulations.gov</a> Docket ID EPA-HQ-OW-2007-1189.                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 180              | USEPA, 2001. Regulatory Determination Support Document for Manganese. EPA 815 R-01-013.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 199              | USEPA. 1988. Manganese; CASRN 7439-96-5. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, DC.                                                                                                                                                                                                                                                                                                                                                                                                           |
| 257              | USEPA. 2003. Health Effects Support Document for Manganese. Office of Water. EPA Report 822-R-03-003. February 2003. 164pp.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 260              | USEPA. 2004. Drinking Water Health Advisory for Manganese. EPA-822-R-04-003. U.S. Environmental Protection Agency, Office of Water, Health and Ecological Criteria Division, Washington, DC.                                                                                                                                                                                                                                                                                                                                                                                                      |

**Meprobamate**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Meprobamate                   |
| CASRN:          | 57-53-4                       |
| DTXSID:         | <a href="#">DTXSID3023261</a> |
| Use:            | anxiolytic                    |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.0022                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects | 9          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                       | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 30                     | lowest therapeutic dose: short-term relief of the symptoms of anxiety | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.06641                      | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element                       | Value | Units     | Assessment Source  | Critical Study               | Critical Effect                                                       | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                 |
|------------------------------------|-------|-----------|--------------------|------------------------------|-----------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.005 | mg/kg/day | FDA 2018; NIH 2018 | Alembic Pharmaceuticals Inc. | lowest therapeutic dose: short-term relief of the symptoms of anxiety | bottle-fed infants | 151                         | 33.0                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 0.005 | mg/kg/day | FDA 2018; NIH 2018 | Alembic Pharmaceuticals Inc. | lowest therapeutic dose: short-term relief of the symptoms of anxiety | general population | 33.8                        | 120                        | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                            | Value       | Units     | Source              | Notes |
|---------------------------------------------------------|-------------|-----------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |           |                     |       |
| Maximum Recommended Daily Dose                          | 40          | mg/kg/day | FDA                 |       |
| Screening level for pharmaceutical - general population | 0.117647059 | mg/L      | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.033333333 | mg/L      | EPA Office of Water |       |

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 1410  | mg/kg   | NIH HSDB                | max   |
| LD50                                             | 750   | mg/kg   | NIH HSDB                | min   |
| Percent of active toxcast in vitro assays tested | 0.43  | percent | EPA Chemistry Dashboard |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0038637 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.522     | no units | TEST QSAR |       |
| Developmental toxin test | 0.896     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Meprobamate  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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| Scoring Data                                                   |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 557                           | 18                | Sites              | 3.23                 | 0.00243                 | 0.0203                 | 0.0664                    | 0.164                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 75                            | 11                | Sites              | 15                   | 0.00243                 | 0.0202                 | 0.0527                    | 0.137                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 482                           | 7                 | Sites              | 1.45                 | 0.00965                 | 0.0385                 | 0.142                     | 0.164                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

| Non-Scoring Data                                                    |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|---------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Non-Nationally Representative Water Data                            | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| <b>Finished Water</b>                                               |             |                               | Prevalence        |                     |                      |                         | Magnitude              |                           |                         |             |       |
| Bradley et al. 2018 (Finished) [53]                                 | 2016        | 26                            | 1                 | Sites               | 3.85                 | 0.0183328               | 0.0183                 | 0.0183                    | 0.0183328               | ug/L        |       |
| Glassmeyer et al 2017 (Finished) [86]                               | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Snyder et al. (2007) via Kumar et al. (2010) (Finished) [128]       | 2007        | 20                            | NA                | Samples             |                      | 0.0016                  | 0.0038                 |                           | 0.013                   | ug/L        |       |
|                                                                     |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                |             |                               | Prevalence        |                     |                      |                         | Magnitude              |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)       | 2008 - 2017 | 210                           | 63                | Sites               | 30                   | 0.00176                 | 0.0102                 | 0.0422                    | 0.199                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)         | 2008 - 2017 | 401                           | 18                | Sites               | 4.49                 | 0.00335                 | 0.0189                 | 0.056                     | 0.0658                  | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)           | 2008 - 2017 | 611                           | 81                | Sites               | 13                   | 0.00176                 | 0.0115                 | 0.0436                    | 0.199                   | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                                | 2007 - 2012 | 25                            | NA                | Sites               | 4                    |                         | 0.0142                 |                           | 0.01418                 | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                  | 2012 - 2014 | 38                            | 16                | Sites               | 42                   | 0.0085162               | 0.0422                 | 0.327                     | 0.405929                | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                             | 2013 - 2015 | 1,106                         | 8                 | Sites               | 0.72                 | 0.0171232               | 0.0211                 | 0.0761                    | 0.1639527               | ug/L        |       |
| Snyder et al. (2007) via Kumar et al. (2010) (Ambient) [128]        | 2007        | 20                            | NA                | Samples             |                      | 0.0014                  | 0.0059                 |                           | 0.016                   | ug/L        |       |
| Benotti et al. (2009) via Kostich et al. 2010 (Ambient) [127]       | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.073                   | ug/L        |       |
| Standley et al. (2008) via Kostich et al. 2010 (Ambient) [127]      | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.007                   | ug/L        |       |
| Trenholm et al. (2006) via Kostich et al. 2010 (Ambient) [127]      | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.01                    | ug/L        |       |
| Vanderford et al. (2003) via Kostich et al. 2010 (Ambient) [127]    | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.22                    | ug/L        |       |
| Vanderford et al. (2006) via Kostich et al. 2010 (Ambient) [127]    | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.594                   | ug/L        |       |
|                                                                     |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                         |             |                               | Prevalence        |                     |                      |                         | Magnitude              |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                                | 2011 - 2017 | 21                            | 20                | Sites               | 95                   | 0.0341876               | 0.117                  | 0.709                     | 1.3396304               | ug/L        |       |
| Trenholm et al. (2006) via Kostich et al. 2010 (Wastewater) [127]   | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.56                    | ug/L        |       |
| Vanderford et al. (2006) via Kostich et al. 2010 (Wastewater) [127] | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 1.44                    | ug/L        |       |
|                                                                     |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                    | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                     |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Exposure exposure                                  |      | 2.46E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 4.65279     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 255.297     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 303.784     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 3.42E-09    | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.000325087 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0171375   | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0240991   | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 1.78529     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 1.19124     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 1.04E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 0.860718    | no units                |       |

**Meprobamate**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                  |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. <i>Environmental Science and Technology</i> 53: 2950-2960.                                                                                                            |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985. |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                                                                                  |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922).                                                         |
| 127              | Kostich, MS, et al., 2010. Predicting variability of aquatic concentrations of human pharmaceuticals. <i>Sci. Total Environ</i> . 408 (20), 4504e4510.                                                                                                                                                                                                          |
| 128              | Kumar, A. and Xagorarakis, I., 2010. Human health risk assessment of pharmaceuticals in water: An uncertainty analysis for meprobamate, carbamazepine, and phenytoin. <i>Regulatory Toxicology and Pharmacology</i> , 57(2-3), pp.146-156.                                                                                                                      |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                                                                                             |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                                                                |



**Metalaxyl**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Metalaxyl                     |
| CASRN:          | 57837-19-1                    |
| DTXSID:         | <a href="#">DTXSID6024175</a> |
| Use:            | Fungicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.000065                   |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 4       | reproductive and developmental effects | 9          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                      | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 700                    | dose-related increases in clinical signs of toxicity (e.g., post-dosing convulsions) | bottle-fed infants | OPP               | 2016                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0453                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**Metalaxyl**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units     | Assessment Source | Critical Study        | Critical Effect                                                                      | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|-----------------------|--------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.5   | mg/kg/day | OPP 2016          | Ciba-Geigy Corp. 1985 | dose-related increases in clinical signs of toxicity (e.g., post-dosing convulsions) | bottle-fed infants | 151                         | 662        | [369]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2016          |                       |                                                                                      |                    |                             |            | [369]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                | Value | Units | Source                                  | Notes |
|---------------------------------------------|-------|-------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |                                         |       |
| Health-Based Screening Level                | 0.474 | mg/L  | Health-based screening levels from USGS |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 669       | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 7120      | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 30.629999 | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 400       | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 250       | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 7.8       | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 3.26      | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 30.629999 | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 7.8       | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0090573 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.191     | no units | TEST QSAR |       |
| Developmental toxin test | 0.606     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Metalaxyl

CCL 5 Contaminant Information Sheet

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OCCURRENCE DATA

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 5,889                         | 367               | Sites              | 6.23                 | 0.00012                 | 0.009                  | 0.0453                    | 3.02                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 715                           | 277               | Sites              | 39                   | 0.00012                 | 0.009                  | 0.0426                    | 1.48                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 5,174                         | 90                | Sites              | 1.74                 | 0.00032                 | 0.01                   | 0.28                      | 3.02                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 2                | 2,967                     | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 13                            | 4                 | Sites               | 31                   | 0.005                   | 0.005                  | 0.0115                    | 0.0375                  | ug/L        |       |
| Bradley et al. 2018 (Finished) [53]                                                    | 2016        | 26                            | 2                 | Sites               | 7.69                 | 0.0203                  | 0.0209                 | 0.0214                    | 0.0215                  | ug/L        |       |
| Community Water System Survey (CWSS) (Finished) [178]                                  | 2006        | 1                             | NA                | Sites               |                      |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 1,407                         | 202               | Sites               | 14                   | 0.00032                 | 0.013                  | 0.11                      | 9.05                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 3,270                         | 61                | Sites               | 1.87                 | 0.00081                 | 0.01                   | 0.371                     | 7.33                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 4,676                         | 263               | Sites               | 5.62                 | 0.00032                 | 0.0124                 | 0.117                     | 9.05                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 179                           | 32                | Sites               | 18                   | 0.0042                  | 0.005                  | 0.0393                    | 0.955                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 172                           | 27                | Sites               | 16                   | 0.0042                  | 0.0107                 | 0.0589                    | 0.955                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 7                             | 5                 | Sites               | 71                   | 0.005                   | 0.005                  | 0.0375                    | 0.0375                  | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 26                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Community Water System Survey (CWSS) (Ambient) [178]                                   | 2006        | 1                             | NA                | Sites               |                      |                         | 0.845                  | 1.31                      |                         | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 8                 | Sites               | 21                   | 0.0085                  | 0.0437                 | 0.116                     | 0.1508                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 796                           | 18                | Sites               | 2.26                 | 3e-04                   | 9e-04                  | 0.243                     | 1.06                    | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                                                   | 2011 - 2017 | 20                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                   |      | 0.000000101                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|-------------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 4.29311    | days                    |       |
| Boiling point                                                     | OPERA QSAR | 299.877    | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 344.018    | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.00000522 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.00000547 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0163893  | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.00233884 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 8.24464    | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 17.1396    | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 3.9E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 1.76605    | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985.                                                                    |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                                                                                                                                   |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                                                                                                                                                              |
| 369              | USEPA. 2016. Mefenoxam. Human Health Risk Assessment for Proposed Use on the Rapeseed Subgroup 20A. EPA-HQ-OPP-2015-0014-0008. DP No. D424727. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                          |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**Metformin**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Metformin                     |
| CASRN:          | 657-24-9                      |
| DTXSID:         | <a href="#">DTXSID2023270</a> |
| Use:            | antidiabetic                  |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxicants                              |  |
| PubMed Neurotoxicants                             |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.0083                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 10         | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                                                                                                     | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 40                     | lowest therapeutic dose: decreases hepatic glucose production, decreases intestinal absorption of glucose, and improves insulin sensitivity by increasing peripheral glucose uptake and utilization | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.333                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**Metformin**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element                       | Value   | Units     | Assessment Source  | Critical Study           | Critical Effect                                                                                                                                                                                     | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                 |
|------------------------------------|---------|-----------|--------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.00625 | mg/kg/day | FDA 2018; NIH 2018 | Ascend Laboratories, LLC | lowest therapeutic dose: decreases hepatic glucose production, decreases intestinal absorption of glucose, and improves insulin sensitivity by increasing peripheral glucose uptake and utilization | bottle-fed infants | 151                         | 42.0                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 0.00625 | mg/kg/day | FDA 2018; NIH 2018 | Ascend Laboratories, LLC | lowest therapeutic dose: decreases hepatic glucose production, decreases intestinal absorption of glucose, and improves insulin sensitivity by increasing peripheral glucose uptake and utilization | general population | 33.8                        | 150                        | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                            | Value       | Units     | Source              | Notes |
|---------------------------------------------------------|-------------|-----------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |           |                     |       |
| Maximum Recommended Daily Dose                          | 50          | mg/kg/day | FDA                 |       |
| Screening level for pharmaceutical - general population | 0.147058824 | mg/L      | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.041666667 | mg/L      | EPA Office of Water |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| Percent of active toxcast in vitro assays tested | 0.75  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0012106 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.207     | no units | TEST QSAR |       |
| Developmental toxin test |           |          | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Metformin

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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**OCCURRENCE DATA**

**Scoring Data**

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 553                           | 70                | Sites              | 13                   | 0.00138                 | 0.0275                 | 0.333                     | 2.64                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 75                            | 69                | Sites              | 92                   | 0.00138                 | 0.0276                 | 0.333                     | 2.64                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 478                           | 1                 | Sites              | 0.21                 | 0.00163                 | 0.00163                | 0.00163                   | 0.00163                 | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

**Non-Scoring Data**

| Non-Nationally Representative Water Data                            | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Finished) [86]                               | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| <b>Ambient Water</b>                                                |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)       | 2008 - 2017 | 205                           | 169               | Sites               | 82                   | 0.0013                  | 0.0732                 | 0.656                     | 13.5                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)         | 2008 - 2017 | 399                           | 11                | Sites               | 2.76                 | 0.00087                 | 0.00401                | 0.401                     | 0.627                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)           | 2008 - 2017 | 604                           | 180               | Sites               | 30                   | 0.00087                 | 0.0721                 | 0.633                     | 13.5                    | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                                | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                  | 2012 - 2014 | 38                            | 25                | Sites               | 66                   | 0.0103849               | 0.41                   | 2.05                      | 4.3079718               | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                             | 2013 - 2015 | 1,106                         | 2                 | Sites               | 0.18                 | 0.0325339               | 0.0356                 | 0.0381                    | 0.0386649               | ug/L        |       |
| Benotti et al. (2007) via Kostich et al. 2010 (Ambient) [127]       | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.092                   | ug/L        |       |
| Kolpin et al. (2002) via Kostich et al. 2010 (Ambient) [127]        | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.15                    | ug/L        |       |
| <b>Waste Water Effluent</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                                | 2011 - 2017 | 19                            | 19                | Sites               | 100                  | 0.0259915               | 1.81                   | 28.4                      | 35.91536                | ug/L        |       |
| Benotti et al. (2007) via Kostich et al. 2010 (Wastewater) [127]    | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 47.253                  | ug/L        |       |
| Glassmeyer et al. (2005) via Kostich et al. 2010 (Wastewater) [127] | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.698                   | ug/L        |       |
| <b>Estimated Concentration in Water</b>                             | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                     |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 1.47E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value     | Units                   | Notes |
|----------------------------------------------------------------|------------|-----------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.98474   | days                    |       |
| Boiling point                                                  | OPERA QSAR | 256.674   | degree C                |       |
| Boiling point                                                  | TEST QSAR  |           |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 6.56E-10  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  |           |                         |       |
| Solubility in water                                            | OPERA QSAR | 0.0483462 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.530884  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 1.94277   | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  |           |                         |       |
| Henry's Law constant                                           | OPERA QSAR | 3.46E-09  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 0.735672  | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                          |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. <i>Environmental Science and Technology</i> 53: 2950-2960.                                                    |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.        |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                          |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922). |
| 127              | Kostich, MS, et al., 2010. Predicting variability of aquatic concentrations of human pharmaceuticals. <i>Sci. Total Environ.</i> 408 (20), 4504e4510.                                                                                                                                                   |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                                     |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.        |



**Methocarbamol**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Methocarbamol                 |
| CASRN:          | 532-03-6                      |
| DTXSID:         | <a href="#">DTXSID6023286</a> |
| Use:            | skeletal muscle relaxant      |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxicants                              |  |
| PubMed Neurotoxicants                             |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.0025                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 9          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                        | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 100                    | lowest therapeutic dose:relief of discomfort associated with acute, painful musculoskeletal conditions | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.2468                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Methocarbamol

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value      | Units     | Assessment Source  | Critical Study     | Critical Effect                                                                                        | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                 |
|------------------------------------|------------|-----------|--------------------|--------------------|--------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.01666667 | mg/kg/day | FDA 2018; NIH 2018 | Granules India Ltd | lowest therapeutic dose:relief of discomfort associated with acute, painful musculoskeletal conditions | bottle-fed infants | 151                         | 110                        | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 0.01666667 | mg/kg/day | FDA 2018; NIH 2018 | Granules India Ltd | lowest therapeutic dose:relief of discomfort associated with acute, painful musculoskeletal conditions | general population | 33.8                        | 390                        | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                            | Value       | Units     | Source              | Notes |
|---------------------------------------------------------|-------------|-----------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |           |                     |       |
| Maximum Recommended Daily Dose                          | 100         | mg/kg/day | FDA                 |       |
| Screening level for pharmaceutical - general population | 0.392156863 | mg/L      | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.111111111 | mg/L      | EPA Office of Water |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| Percent of active toxcast in vitro assays tested | 1.7   | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0036141 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.734     | no units | TEST QSAR |       |
| Developmental toxin test | 0.731     | no units | TEST QSAR |       |

Methocarbamol  
CCL 5 Contaminant Information Sheet  
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## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 557                                 | 22                   | Sites                 | 3.95                    | 0.00074                    | 0.0242                    | 0.247                        | 2.49                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 75                                  | 21                   | Sites                 | 28                      | 0.00074                    | 0.026                     | 0.259                        | 2.49                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 482                                 | 1                    | Sites                 | 0.21                    | 0.00145                    | 0.00145                   | 0.00145                      | 0.00145                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Bradley et al. 2018 (Finished) [53]                           | 2016        | 26                                  | 1                    | Sites                  | 3.85                    | 0.5983694                  | 0.598                     | 0.598                        | 0.5983694                  | ug/L        |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                                  | NA                   | Sites                  | 0                       |                            |                           |                              |                            | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 207                                 | 84                   | Sites                  | 41                      | 0.00076                    | 0.0196                    | 0.139                        | 0.383                      | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 401                                 | 6                    | Sites                  | 1.5                     | 0.00198                    | 0.0334                    | 0.269                        | 0.55                       | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 608                                 | 90                   | Sites                  | 15                      | 0.00076                    | 0.0196                    | 0.139                        | 0.55                       | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                                  | NA                   | Sites                  | 8                       |                            | 0.0291                    |                              | 0.0323                     | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                                  | 16                   | Sites                  | 42                      | 0.0139004                  | 0.188                     | 0.736                        | 2.6272938                  | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                       | 2013 - 2015 | 1,106                               | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                                  | 19                   | Sites                  | 90                      | 0.0153466                  | 0.306                     | 0.719                        | 7.79                       | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expcast exposure                                   |      | 0.000000165                                   |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 4.48255     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 312.903     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 362.745     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 7.2E-09     | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.000000925 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.100228    | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0132739   | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 1.10629     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 2.10863     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 5.9E-10     | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 0.65558     | no units                |       |

**Methocarbamol**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                  |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. <i>Environmental Science and Technology</i> 53: 2950-2960.                                                                                                            |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985. |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                                                                                  |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922).                                                         |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                                                                                             |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                                                                |

**Methomyl**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Methomyl                      |
| CASRN:          | 16752-77-5                    |
| DTXSID:         | <a href="#">DTXSID1022267</a> |
| Use:            | Insecticide                   |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 | X |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 1.5                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 6       | reproductive and developmental effects | 1          | 6         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                           | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 2                      | increases in peak red blood cell acetylcholinesterase inhibition in human | bottle-fed infants | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 2.92                         | 90th Percentile                               | Finished Water                       | UCM2   | 1993-1997 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Methomyl

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study | Critical Effect                                                           | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|----------------|---------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0015 | mg/kg/day | OPP 2018          | McFarlane 1998 | increases in peak red blood cell acetylcholinesterase inhibition in human | bottle-fed infants | 151                         | 1.99       | [403]                    |       |
| Cancer Classification (CC)         | NL     |           | OPP 2018          |                |                                                                           |                    |                             |            | [403]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units | Source         | Notes |
|---------------------------------------------|-------|-------|----------------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |                |       |
| 10-day Health Advisory                      | 0.3   | mg/L  | EPA DWSHA 2018 |       |
| Lifetime Health Advisory                    | 0.2   | mg/L  | EPA DWSHA 2018 |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 10    | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 45    | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 10    | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 56.5  | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 2.5   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 38.8  | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 2.28  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 12.5  | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 2.5   | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0002421 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.871     | no units | TEST QSAR |       |
| Developmental toxin test | 0.501     | no units | TEST QSAR |       |

Nationally Represented

**Methomyl**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 403              | USEPA. 2018. Methomyl and Thiodicarb: Draft Human Health Risk Assessment in Support of Registration Review. EPA-HQ-OPP-2009-0432-0017. DP Nos. D420613 D439094. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                         |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |



**Methyl mercury**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                              |
|-----------------|------------------------------------------------------------------------------|
| Name:           | Methyl mercury                                                               |
| CASRN:          | 22967-92-6                                                                   |
| DTXSID:         | <a href="#">DTXSID9024198</a>                                                |
| Use:            | Fungicide and seedborne diseases, as timber preservatives, and disinfectants |
| Chemical Notes: |                                                                              |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             |   |
| Human Neurotoxicants                              | X |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 | X |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.00095                    |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 7       | reproductive and developmental effects | 10         | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                             | Target Pop.     | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------------------------|-----------------|-------------------|----------------------|
| HRL                                                      | 0.4                    | Developmental neuropsychological impairment | lactating women | IRIS              | 2001                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.00038                      | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Methyl mercury

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study                                        | Critical Effect                                                                                     | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0003 | mg/kg/day | ATSDR 1999; 2013  | Davidson et al. 1998                                  | Effects of prenatal and postnatal methylmercury exposure from fish consumption on neurodevelopment: | lactating women   | 46.9                        | 1.28       | [15] [33]                |       |
| Reference Dose (RfD) or Equivalent | 0.0001 | mg/kg/day | IRIS 2001         | Grandjean et al., 1997; Budtz-Jørgensen et al., 1999a | Developmentalneuropsychological impairment                                                          | lactating women   | 46.9                        | 0.426      | [242]                    |       |
| Cancer Classification (CC)         | C      |           | IRIS 2001         |                                                       |                                                                                                     |                   |                             |            | [242]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects           | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|----------------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Systemic, Neurological      | 0.000913                    | Li, 2018           | Neurological, Hepatic, Renal, Systemic | 4                            | Abdalla, 2012       | 2012-03-01           | 2020-01-15         | 2245                                           | 31                                              | 125                                            | 17                                                |

## Other Health Data

| Data Element                                | Value | Units    | Source   | Notes |
|---------------------------------------------|-------|----------|----------|-------|
| <b>Measured Data and Assessment Results</b> |       |          |          |       |
| Cancer Classification (CC)                  | 2B    | no units | WHO IARC |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units | Source   | Notes |
|---------------------------------------------|-------|-------|----------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |          |       |
| LD50                                        | 58    | mg/kg | NIH HSDB |       |

| Data Element             | Value | Units | Source    | Notes |
|--------------------------|-------|-------|-----------|-------|
| <b>Modeled Data</b>      |       |       |           |       |
| LD50                     |       |       | TEST QSAR |       |
| Ames mutagenicity test   |       |       | TEST QSAR |       |
| Developmental toxin test |       |       | TEST QSAR |       |

## Methyl mercury

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 510                           | 416               | Sites              | 82                   | 4.00E - 05              | 0.00011                | 0.00038                   | 2                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 447                           | 384               | Sites              | 86                   | 4.00E - 05              | 0.00011                | 0.000345                  | 0.00406                 | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 63                            | 32                | Sites              | 51                   | 4.00E - 05              | 0.00027                | 0.0013                    | 2                       | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 552                           | 469               | Sites               | 85                   | 1.00E - 05              | 0.00019                | 0.0018                    | 0.22                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 26                            | 18                | Sites               | 69                   | 5.00E - 05              | 0.00017                | 0.000536                  | 0.0013                  | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 573                           | 484               | Sites               | 84                   | 1.00E - 05              | 0.00019                | 0.0018                    | 0.22                    | ug/L        |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                   |      |                                         |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

**Methyl mercury**

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| Reference Number | Full Reference                                                                                                                                                                                                                           |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 15               | ATSDR. 1999. TOXICOLOGICAL PROFILE FOR MERCURY. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                              |
| 33               | ATSDR. 2013. Addendum to the Toxicological Profile for Mercury (Alkyl and Dialkyl compounds). U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA |
| 242              | USEPA. 2001. Chemical Assessment Summary Methylmercury. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, DC.                                   |

**Methyl tert-butyl ether (MTBE)**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                          |
|-----------------|--------------------------------------------------------------------------|
| Name:           | Methyl tert-butyl ether (MTBE)                                           |
| CASRN:          | 1634-04-4                                                                |
| DTXSID:         | <a href="#">DTXSID3020833</a>                                            |
| Use:            | Octane booster in gasoline; manufacture of isobutene; extraction solvent |
| Chemical Notes: |                                                                          |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxics                                 |  |
| PubMed Neurotoxics                                |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| List                     | 1.7                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
|         | no adverse effects | 5          | 8         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect       | Target Pop. | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------|-------------|-------------------|----------------------|
| HRL                                                      | 20                     | organoleptic endpoint |             | OW                | 1997                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 34.6                         | 90th Percentile                               | Finished Water                       | UCMR1  | 2001-2003 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     | X     | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |
| Not Applicable |                |                |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Methyl tert-butyl ether (MTBE)

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                                                                                                                                                                                        |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|              |       |       | WHO 2005          |                |                 |                   |                             |            | [440]                    |                                                                                                                                                                                                                                                              |
|              |       |       | OW 1997           |                |                 |                   |                             |            | [226]                    | NOTE: The MTBE Health Advisory notes that keeping levels of contamination MTBE in the range of 20 to 40 ug/L or below would protect consumer acceptance of the water resource and would also provide a large margin of exposure (safety) from toxic effects. |
|              |       |       | HC 2006           |                |                 |                   |                             |            | [99]                     |                                                                                                                                                                                                                                                              |
|              |       |       | ATSDR 1996        |                |                 |                   |                             |            | [12]                     |                                                                                                                                                                                                                                                              |
|              |       |       | CALEPA 1999       |                |                 |                   |                             |            | [56]                     |                                                                                                                                                                                                                                                              |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects   | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-------------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Hematological, Cardiovascular | 0.0055                      | Saeedi, 2017b      | Nervous, Respiratory,        | 1600                         | Dong-mei, 2009      | 2005-01-01           | 2020-01-15         | 909                                            | 9                                               | 10                                             | 8                                                 |

## Other Health Data

| Data Element                                      | Value      | Units          | Source                             | Notes |
|---------------------------------------------------|------------|----------------|------------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |            |                |                                    |       |
| Acute Health-Based Guidance Value                 | 0.7        | mg/L           | MN DOH                             |       |
| Acute inhalation Minimal Risk Level (MRL)         | 2          | ppm            | CDC ATSDR                          |       |
| Acute Minimal Risk Level (MRL)                    | 0.4        | mg/kg/day      | CDC ATSDR                          |       |
| Cancer Classification (CC)                        | 3          | no units       | WHO IARC                           |       |
| Cancer Slope Factor (CSF)                         | 0.0018     | (mg/kg/day)^-1 | CalEPA OEHHA Chemical Database     |       |
| Chronic Health-Based Guidance Value               | 0.7        | mg/L           | MN DOH                             |       |
| Chronic Health-Based Guidance Value               | 0.006      | mg/L           | MN DOH                             |       |
| Chronic inhalation Minimal Risk Level (MRL)       | 0.7        | ppm            | CDC ATSDR                          |       |
| Inhalation Unit Risk (IUR)                        | 0.00000026 | ug/m^3         | CalEPA OEHHA Chemical Database     |       |
| Intermediate Inhalation Minimal Risk Level (MRL)  | 0.7        | ppm            | CDC ATSDR                          |       |
| Intermediate Minimal Risk Level (MRL)             | 0.3        | mg/kg/day      | CDC ATSDR                          |       |
| Public Health Goal                                | 0.013      | mg/L           | CalEPA OEHHA Public Health Goals   |       |
| Reference Concentration (RfC)                     | 3          | mg/m^3         | EPA IRIS                           |       |
| Reference Concentration (RfC)                     | 8000       | ug/m^3         | CalEPA OEHHA Chemical Database     |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.7        | mg/L           | MN DOH                             |       |
| Maximum Allowable Concentration (MAC)             | None       | no units       | Canadian Drinking Water Guidelines |       |

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 4000  | mg/kg   | NIH HSDB                |       |
| Percent of active toxcast in vitro assays tested | 2.13  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0128233 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.033     | no units | TEST QSAR |       |
| Developmental toxin test | 0.384     | no units | TEST QSAR |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Methyl tert-butyl ether (MTBE)  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 | 3,871                               | 19                   | Sites                 | 0.49                    | 5                          | 9.2                       | 34.6                         | 49                         | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 7,709                               | 870                  | Sites                 | 11                      | 0.01                       | 0.21                      | 3.47                         | 23000                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 263                                 | 122                  | Sites                 | 46                      | 0.01                       | 0.24                      | 1.81                         | 81.3                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 7,446                               | 748                  | Sites                 | 10                      | 0.01                       | 0.2                       | 6.3                          | 23000                      | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) | 34                  | 1,740,624                     | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) | 1B - 5B                      |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 495                                 | 13                   | Sites                  | 2.63                    | 0.024                      | 1.8                       | 4.4                          | 55                         | ug/L        |       |
| Drinking Water Monitoring Data - MA (Finished)                | 2006 - 2020 | 926                                 | 231                  | Sites                  | 25                      | 0.5                        | 1.3                       | 8.1                          | 265                        | ug/L        |       |
| Community Water System Survey (CWSS) (Finished) [178]         | 2006        | 1                                   | NA                   | Sites                  |                         |                            | 0.5                       | 5                            |                            | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 4,763                               | 70                   | Sites                  | 1.47                    | 0.06                       | 6.22                      | 36                           | 1900                       | ug/L        |       |
| Drinking Water Monitoring Data - FL (Source)                  | 2006 - 2011 | 5                                   | 4                    | Sites                  | 80                      | 0.14                       | 0.52                      | 1.6                          | 3.7                        | ug/L        |       |
| Drinking Water Monitoring Data - MA (Source)                  | 2006 - 2020 | 138                                 | 46                   | Sites                  | 33                      | 0.5                        | 4.2                       | 101                          | 880                        | ug/L        |       |
| Drinking Water Monitoring Data - PA (Source)                  | 2006 - 2011 | 24                                  | 14                   | Sites                  | 58                      | 0.2                        | 6                         | 1300                         | 61000                      | ug/L        |       |
| Drinking Water Monitoring Data - WI (Source)                  | 2012-2019   | 101                                 | 1                    | Sites                  | 0.99                    | 39                         | 73.5                      | 101                          | 108                        | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 283                                 | 21                   | Sites                  | 7.42                    | 0.01                       | 0.05                      | 0.189                        | 0.97                       | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 4,403                               | 312                  | Sites                  | 7.09                    | 0.01                       | 0.16                      | 1.56                         | 1080                       | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 4,683                               | 333                  | Sites                  | 7.11                    | 0.01                       | 0.15                      | 1.38                         | 1080                       | ug/L        |       |
| Community Water System Survey (CWSS) (Ambient) [178]          | 2006        | 1                                   | NA                   | Sites                  |                         |                            | 1.05                      | 5.2                          |                            | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                                  | 4                    | Sites                  | 11                      | 0.01845                    | 0.0237                    | 0.0388                       | 0.04319                    | ug/L        |       |
| Arnold et al. 2016 (Unfiltered) [7]                           | 2012 - 2013 | 685                                 | 55                   | Sites                  | 8.03                    | 0.01                       | 0.06                      | 0.765                        | 4.47                       | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water                              | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expocast exposure                                  |      | 0.000000122                                   |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) | < LOD                           | pg/ml |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 7.21225     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 58.0708     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 68.237      | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 316.295     | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 215.278     | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.330721    | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.290402    | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 2.51817     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 4.0738      | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.000937822 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 1.0899      | no units                |       |

**Methyl tert-butyl ether (MTBE)**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 12               | ATSDR. 1996. Toxicological Profile for Methyl tert-Butyl Ether. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                                                                                                                                                        |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 56               | CalEPA. 1999. Public Health Goal for Methyl Tertiary Butyl Ether (MTBE) in Drinking Water. California Environmental Protection Agency (CalEPA), Office of Environmental Health Hazard Assessment, Pesticide and Environmental Toxicology Section, Sacramento, CA.                                                                                                                                                                  |
| 99               | Health Canada. 2006. Guidelines for Canadian Drinking Water Quality: Guideline Technical Document Methyl Tertiary-Butyl Ether. Health Canada (HC), Ottawa, Ontario, Canada.                                                                                                                                                                                                                                                        |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                                                                                                                                                              |
| 226              | USEPA. 1997. Drinking Water Advisory: Consumer Acceptability Advice and Health Effects Analysis on Methyl Tertiary-Butyl Ether (MtBE). U.S. Environmental Protection Agency, Office of Water, Health and Ecological Criteria Division, Washington, DC.                                                                                                                                                                             |
| 440              | WHO. 2005. Methyl tertiary-Butyl Ether (MTBE) in Drinking-water Background document for development of WHO Guidelines for Drinking-water Quality. World Health Organization (WHO), Geneva, Switzerland.                                                                                                                                                                                                                            |



## Metolachlor ethanesulfonic acid (ESA)

CCL 5 Contaminant Information Sheet

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                       |
|-----------------|---------------------------------------|
| Name:           | Metolachlor ethanesulfonic acid (ESA) |
| CASRN:          | 171118-09-5                           |
| DTXSID:         | <a href="#">DTXSID1037567</a>         |
| Use:            | Pesticide degradate                   |
| Chemical Notes: |                                       |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.0013                     |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 4       | non-cancer effects | 8          | 7         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                          | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 2000                   | increased liver weight and increased serum liver enzymes | general population | MDH               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 2.619857                     | 90th Percentile                               | Finished Water                       | UCMR2  | 2008-2010 |

## PUBLIC NOMINATION STATUS

|                   |
|-------------------|
| Public Nomination |
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     | X     | X     |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

## Basis

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Metolachlor ethanesulfonic acid (ESA)

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                                              | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|--------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.07  | mg/kg/day | CALEPA 2017       | Altmann 1999   | changes in clinical chemistry data and absolute liver weight | general population | 33.8                        | 414                        | [61]                     |       |
| Reference Dose (RfD) or Equivalent | 0.27  | mg/kg/day | MDH 2018          | Altmann 1999   | increased liver weight and increased serum liver enzymes     | general population | 33.8                        | 1600                       | [144]                    |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                      | Value | Units | Source | Notes |
|---------------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b>       |       |       |        |       |
| Chronic Health-Based Guidance Value               | 0.8   | mg/L  | MN DOH |       |
| Short-Term/Subchronic Health-Based Guidance Value | 4     | mg/L  | MN DOH |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| Percent of active toxcast in vitro assays tested | 1.77  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0101625 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.62      | no units | TEST QSAR |       |
| Developmental toxin test | 1.269     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

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EPA - Office of Water

Metolachlor ethanesulfonic acid (ESA)

CCL 5 Contaminant Information Sheet

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OCCURRENCE DATA

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                                |             |                                     | Prevalence           |                       |                         |                            |                           | Magnitude                    |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 | 1,198                               | 19                   | Sites                 | 1.59                    | 1                          | 1.44                      | 2.62                         | 3.95455                    | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                                |             |                                     | Prevalence           |                       |                         |                            |                           | Magnitude                    |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 2,722                               | 915                  | Sites                 | 34                      | 0.0036                     | 0.284                     | 1.66                         | 35                         | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 422                                 | 312                  | Sites                 | 74                      | 0.0036                     | 0.28                      | 1.51                         | 8.4                        | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 2,300                               | 603                  | Sites                 | 26                      | 0.0048                     | 0.315                     | 4.92                         | 35                         | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                  |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     | Prevalence           |                        |                         |                            |                           | Magnitude                    |                            |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 4                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                                  | 14                   | Sites                  | 82                      | 6e-04                      | 0.054                     | 0.69                         | 2.5                        | ug/L        |       |
| Bradley et al. 2018 (Finished) [53]                                                    | 2016        | 26                                  | 7                    | Sites                  | 27                      | 0.02                       | 0.027                     | 0.212                        | 0.23                       | ug/L        |       |
| Community Water System Survey (CWSS) (Finished) [178]                                  | 2006        | 1                                   | NA                   | Sites                  |                         |                            | 2.35                      | 2.35                         |                            | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     | Prevalence           |                        |                         |                            |                           | Magnitude                    |                            |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 2                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 355                                 | 169                  | Sites                  | 48                      | 0.0075                     | 0.182                     | 0.827                        | 2.89                       | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 830                                 | 290                  | Sites                  | 35                      | 0.0123                     | 0.291                     | 2.2                          | 14.8                       | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 1,185                               | 459                  | Sites                  | 39                      | 0.0075                     | 0.208                     | 1.25                         | 14.8                       | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                                 | 193                  | Sites                  | 84                      | 0.000599                   | 0.066                     | 0.735                        | 18                         | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                                 | 186                  | Sites                  | 85                      | 0.000599                   | 0.0528                    | 0.87                         | 18                         | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                                  | 9                    | Sites                  | 75                      | 6e-04                      | 0.0735                    | 0.716                        | 3.603                      | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 56                                  | 33                   | Sites                  | 59                      | 0.05                       | 0.128                     | 0.272                        | 0.502                      | ug/L        |       |
| Community Water System Survey (CWSS) (Ambient) [178]                                   | 2006        | 1                                   | NA                   | Sites                  |                         |                            | 1.55                      | 6.01                         |                            | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                                  | 22                   | Sites                  | 58                      | 0.02                       | 0.125                     | 0.416                        | 1                          | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 584                                 | 106                  | Sites                  | 18                      | 0.0048                     | 0.338                     | 3.48                         | 31.1                       | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     | Prevalence           |                        |                         |                            |                           | Magnitude                    |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg-<br>bw/day) | Notes |
|----------------------------------------------------|------|------------------------------------------------|-------|
| Expcast exposure                                   |      | 0.000000125                                    |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|-------------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 4.64024    | days                    |       |
| Boiling point                                                     | OPERA QSAR | 314.443    | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 404.135    | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 5.03E-08   | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  |            |                         |       |
| Solubility in water                                               | OPERA QSAR | 0.0102496  | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.00190108 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 9.61626    | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 9.95405    | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 4.27E-10   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 3.49063    | no units                |       |

**Metolachlor ethanesulfonic acid (ESA)**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985.                                                                    |
| 61               | CalEPA. 2017. Public Health Concentration: Metolachlor and Metolachlor Degradates Ethanesulfonic Acid and Oxanilic Acid in Groundwater. California Environmental Protection Agency (CalEPA), Office of Environmental Health Hazard Assessment, Pesticide and Environmental Toxicology Branch, Sacramento, CA.                                                                                                                      |
| 144              | MDH. 2018. Toxicological Summary for: Metolachlor ESA. Health Based Guidance for Water. Minnesota Department of Health (MDH), Environmental Health Division, Health Risk Assessment Unit, St Paul, MN.                                                                                                                                                                                                                             |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                                                                                                                                                              |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

## Metolachlor oxanilic acid (OA)

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                |
|-----------------|--------------------------------|
| Name:           | Metolachlor oxanilic acid (OA) |
| CASRN:          | 152019-73-3                    |
| DTXSID:         | <a href="#">DTXSID6037568</a>  |
| Use:            | Pesticide degradate            |
| Chemical Notes: |                                |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.0017                     |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 4       | non-cancer effects | 1          | 8         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                 | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 2000                   | changes in blood chemistry parameters without identified specific target organs | general population | MDH               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 3.4468                       | 90th Percentile                               | Finished Water                       | UCMR2  | 2008-2010 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     | X     | X     |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

## Basis

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Metolachlor oxanilic acid (OA)

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                                                                 | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|---------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.17  | mg/kg/day | CALEPA 2017       | Lees 2004      | changes in clinic chemistry data                                                | general population | 33.8                        | 1010                       | [61]                     |       |
| Reference Dose (RfD) or Equivalent | 0.27  | mg/kg/day | MDH 2018          | Syngenta 2004  | changes in blood chemistry parameters without identified specific target organs | general population | 33.8                        | 1600                       | [145]                    |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                      | Value | Units | Source | Notes |
|---------------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b>       |       |       |        |       |
| Acute Health-Based Guidance Value                 | 3     | mg/L  | MN DOH |       |
| Chronic Health-Based Guidance Value               | 0.8   | mg/L  | MN DOH |       |
| Short-Term/Subchronic Health-Based Guidance Value | 3     | mg/L  | MN DOH |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| Percent of active toxcast in vitro assays tested | 0.72  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0094624 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.353     | no units | TEST QSAR |       |
| Developmental toxin test | 0.732     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Metolachlor oxanilic acid (OA)

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

OCCURRENCE DATA

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 | 1,198                         | 1                 | Sites              | 0.08                 | 2.502                   | 3.08                   | 3.45                      | 3.539                   | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 2,723                         | 500               | Sites              | 18                   | 0.01                    | 0.245                  | 1.02                      | 19                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 423                           | 234               | Sites              | 55                   | 0.01                    | 0.244                  | 0.942                     | 12                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 2,300                         | 266               | Sites              | 12                   | 0.02                    | 0.28                   | 1.97                      | 19                      | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 4                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 13                | Sites               | 76                   | 0.003                   | 0.036                  | 0.315                     | 4.42                    | ug/L        |       |
| Bradley et al. 2018 (Finished) [53]                                                    | 2016        | 26                            | 4                 | Sites               | 15                   | 0.03                    | 0.155                  | 0.332                     | 0.38                    | ug/L        |       |
| Community Water System Survey (CWSS) (Finished) [178]                                  | 2006        | 1                             | NA                | Sites               |                      |                         | 1.77                   | 1.77                      |                         | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 355                           | 110               | Sites               | 31                   | 0.012                   | 0.17                   | 0.508                     | 2.5                     | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 830                           | 160               | Sites               | 19                   | 0.02                    | 0.19                   | 1.5                       | 19.6                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 1,185                         | 270               | Sites               | 23                   | 0.012                   | 0.178                  | 0.738                     | 19.6                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 181               | Sites               | 79                   | 0.003                   | 0.04                   | 0.29                      | 4.36                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 174               | Sites               | 79                   | 0.003                   | 0.0213                 | 0.214                     | 4.36                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 9                 | Sites               | 75                   | 0.003                   | 0.0565                 | 0.311                     | 1.5                     | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 56                            | 22                | Sites               | 39                   | 0.05                    | 0.062                  | 0.0924                    | 0.113                   | ug/L        |       |
| Community Water System Survey (CWSS) (Ambient) [178]                                   | 2006        | 1                             | NA                | Sites               |                      |                         | 1.08                   | 5.14                      |                         | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 16                | Sites               | 42                   | 0.02                    | 0.04                   | 0.205                     | 0.66                    | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 584                           | 30                | Sites               | 5.14                 | 0.051                   | 0.314                  | 1.84                      | 17.6                    | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 0.000000119                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.35407     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 319.319     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 356.287     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000000191 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000000653 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00424338  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00225944  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 2.91419     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 1.57398     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 8.32E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.6119      | no units                |       |

**Metolachlor oxanilic acid (OA)**

CCL 5 Contaminant Information Sheet

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985.                                                                    |
| 61               | CalEPA. 2017. Public Health Concentration: Metolachlor and Metolachlor Degradates Ethanesulfonic Acid and Oxanilic Acid in Groundwater. California Environmental Protection Agency (CalEPA), Office of Environmental Health Hazard Assessment, Pesticide and Environmental Toxicology Branch, Sacramento, CA.                                                                                                                      |
| 145              | MDH. 2018. Toxicological Summary for: Metolachlor OXA. Health Based Guidance for Water. Minnesota Department of Health (MDH), Environmental Health Division, Health Risk Assessment Unit, St Paul, MN.                                                                                                                                                                                                                             |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                                                                                                                                                              |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |



**Metoprolol**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                                                             |
|-----------------|-------------------------------------------------------------------------------------------------------------|
| Name:           | Metoprolol                                                                                                  |
| CASRN:          | 51384-51-1                                                                                                  |
| DTXSID:         | <a href="#">DTXSID2023309</a>                                                                               |
| Use:            | beta-1 blocking agent that is commonly used to treat ANGINA PECTORIS; HYPERTENSION; and CARDIAC ARRHYTHMIAS |
| Chemical Notes: |                                                                                                             |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxicants                              |  |
| PubMed Neurotoxicants                             |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.18                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 7       | non-cancer effects | 8          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                    | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 0.7                    | lowest therapeutic dose: treatment of hypertension | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.126                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**Metoprolol**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|--------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                          |            |                          |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element                       | Value       | Units     | Assessment Source  | Critical Study    | Critical Effect                                    | Target Population  | Exposure Factor (mL/kg-) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                 |
|------------------------------------|-------------|-----------|--------------------|-------------------|----------------------------------------------------|--------------------|--------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.000104167 | mg/kg/day | FDA 2018; NIH 2018 | Ethex Corporation | lowest therapeutic dose: treatment of hypertension | bottle-fed infants | 151                      | 0.690                      | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 0.000104167 | mg/kg/day | FDA 2018; NIH 2018 | Ethex Corporation | lowest therapeutic dose: treatment of hypertension | general population | 33.8                     | 2.50                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References Identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      | 2020-01-28         | 3342                                           |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                            | Value       | Units     | Source              | Notes |
|---------------------------------------------------------|-------------|-----------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |           |                     |       |
| Maximum Recommended Daily Dose                          | 6.67        | mg/kg/day | FDA                 |       |
| Screening level for pharmaceutical - general population | 0.00245098  | mg/L      | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.000694444 | mg/L      | EPA Office of Water |       |

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 1158  | mg/kg   | NIH HSDB                | min   |
| LD50                                             | 3090  | mg/kg   | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 2.99  | percent | EPA Chemistry Dashboard |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0121339 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.04      | no units | TEST QSAR |       |
| Developmental toxin test | 0.497     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Metoprolol  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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| Scoring Data                                                   |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|--|
| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |  |
| <b>Finished Water</b>                                          |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |  |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |
| <b>Ambient Water</b>                                           |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |  |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 557                           | 13                | Sites              | 2.33                 | 0.00147                 | 0.0156                 | 0.126                     | 0.416                   | ug/L        |       |  |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 75                            | 12                | Sites              | 16                   | 0.00147                 | 0.0169                 | 0.128                     | 0.416                   | ug/L        |       |  |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 482                           | 1                 | Sites              | 0.21                 | 0.00196                 | 0.00196                | 0.00196                   | 0.00196                 | ug/L        |       |  |

| Pesticide Application Data                         |  | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 |  | Number of States | Amount Released (lbs/year) | Chemical Production Data                           |  | Production Volume (lbs/year) |
|----------------------------------------------------|--|------------------|---------------------------|------|----------------------------------------------------|--|------------------|----------------------------|----------------------------------------------------|--|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |  |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |  |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |  |                              |

| Non-Scoring Data                                                |  |              |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|-----------------------------------------------------------------|--|--------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Non-Nationally Representative Water Data                        |  | Date         | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| Finished Water                                                  |  |              | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Finished) [86]                           |  | 2007 - 2012  | 25                            | NA                | Sites               | 12                   |                         | 0.0085                 |                           | 0.0184                  | ug/L        |       |
| Padhye et al. 2013 (Finished) [155]                             |  | 2009 - 2010  | 8                             | 1                 | Samples             | 12                   | 0                       | 0                      |                           | 1e-07 +/- 0             | ug/L        |       |
| Ambient Water                                                   |  |              | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)   |  | 2008 - 2017  | 205                           | 55                | Sites               | 27                   | 0.00146                 | 0.00776                | 0.171                     | 0.521                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)     |  | 2008 - 2017  | 401                           | 3                 | Sites               | 0.75                 | 0.0668                  | 0.123                  | 0.164                     | 0.182                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)       |  | 2008 - 2017  | 606                           | 58                | Sites               | 9.57                 | 0.00146                 | 0.0083                 | 0.176                     | 0.521                   | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                            |  | 2007 - 2012  | 25                            | NA                | Sites               | 32                   |                         | 0.0114                 |                           | 0.0378                  | ug/L        |       |
| Batt et al. 2016 (Ambient) [46]                                 |  | 2008 - 2009  | 182                           | 73                | Sites               | 40                   | 0.0043                  | 0.0175                 | 0.0751                    | 0.2177                  | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                              |  | 2012 - 2014  | 38                            | 16                | Sites               | 42                   | 0.0020983               | 0.0637                 | 0.116                     | 0.3671431               | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                         |  | 2013 - 2015  | 1,106                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Padhye et al. 2013 (Ambient) [155]                              |  | 2009 - 2010  | 8                             | 8                 | Samples             | 100                  | 1e-07 +/- 0             | 1e-07                  |                           | 3e-07 +/- 1e-07         | ug/L        |       |
| Batt et al. (2008) via Kostich et al. 2010 (Ambient) [127]      |  | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.012                   | ug/L        |       |
| Fono et al. (2006) via Kostich et al. 2010 (Ambient) [127]      |  | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.571                   | ug/L        |       |
| Waste Water Effluent                                            |  |              | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                            |  | 2011 - 2017  | 21                            | 21                | Sites               | 100                  | 0.0201093               | 0.173                  | 0.654                     | 6.989373                | ug/L        |       |
| Kostich et al. 2014 (Wastewater) [126]                          |  | not reported | 50                            | 49                | Sites               | 98                   | 0.1077                  | 0.398                  | 0.723                     | 1.1692                  | ug/L        |       |
| Batt et al. (2008) via Kostich et al. 2010 (Wastewater) [127]   |  | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.65                    | ug/L        |       |
| Conkle et al. (2008) via Kostich et al. 2010 (Wastewater) [127] |  | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 0.211                   | ug/L        |       |
| Fono et al. (2006) via Kostich et al. 2010 (Wastewater) [127]   |  | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 2.269                   | ug/L        |       |
| Hugget et al. (2003) via Kostich et al. 2010 (Wastewater) [127] |  | 2010         | NA                            | NA                |                     |                      |                         |                        |                           | 1.2                     | ug/L        |       |
| Estimated Concentration in Water                                |  | Date         | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                 |  |              |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Exposure exposure                                  |      |                                         |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.35452     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 311.409     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 361.85      | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.000000498 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.0000013   | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0459364   | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0223357   | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 17.2182     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 32.8852     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.000000126 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 1.93639     | no units                |       |

**Metoprolol**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                          |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 46               | Batt, A. L., Kincaid, T. M., Kostich, M. S., Lazorchak, J. M., & Olsen, A. R. (2016). Evaluating the extent of pharmaceuticals in surface waters of the United States using a National-scale Rivers and Streams Assessment survey. <i>Environmental toxicology and chemistry</i> , 35(4), 874-881.      |
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. <i>Environmental Science and Technology</i> 53: 2950-2960.                                                    |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.        |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                          |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922). |
| 126              | Kostich MS, et al. 2014 Concentrations of prioritized pharmaceuticals in effluents from 50 large wastewater treatment plants in the US and implications for risk estimation. <i>Environ Pollut</i> . 2014 Jan;184:354-9. doi: 10.1016/j.envpol.2013.09.013. Epub 2013 Oct 3. PMID: 24095705.            |
| 127              | Kostich, MS, et al., 2010. Predicting variability of aquatic concentrations of human pharmaceuticals. <i>Sci. Total Environ</i> . 408 (20), 4504e4510.                                                                                                                                                  |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                                     |
| 155              | Padhye, L.P., Yao, H., Kung'u, F.T., and Huang, C.H. Year-long evaluation on the occurrence and fate of pharmaceuticals, personal care products, and endocrine disrupting chemicals in an urban drinking water treatment plant. 2014. <i>Water Research</i> 51 (2014) 266-276.                          |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.        |

**Metribuzin**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Metribuzin                    |
| CASRN:          | 21087-64-9                    |
| DTXSID:         | <a href="#">DTXSID6024204</a> |
| Use:            | Herbicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.013                      |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects | 1          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                          | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 8                      | increased thyroid and liver weights, thyroid follicular cell hyperplasia | general population | OPP               | 2017                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.1                          | 90th Percentile                               | Finished Water                       | UCM2   | 1993-1997 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1  | RD 2           | RD 3           |
|-------|----------------|----------------|
| X     | Not Applicable | Not Applicable |
| Basis |                |                |

Metribuzin may cause adverse health effects at high doses, as evidences has shown from animal studies, but its occurrence in public water systems and the numbers of people potentially exposed through drinking water are low [a,b,c,d,e]. Therefore, metribuzin may not occur in drinking water at frequencies that are of public health concern or that regulation represents a meaningful opportunity for health risk reduction in persons served by public water systems [a,b,c,d,e].

[a] USEPA, 1998 [184]; [b] Kolpin, Barbash, & Gilliom, 1998 [124]; [c] USEPA, 2001 [239]; [d] USEPA, 2001 [247]; [e] USEPA, 2003 [186]; as cited in USEPA, 2001 [181]

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**Metribuzin**

CCL 5 Contaminant Information Sheet

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value  | Units     | Assessment Source | Critical Study            | Critical Effect                                                                                                       | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0013 | mg/kg/day | OPP 2017          | Christenson & Wahle, 1993 | increased thyroid and liver weights, thyroid follicular cell hyperplasia, decreased body weight and body weight gains | general population | 33.8                        | 7.69       | [386]                    |       |
| Cancer Classification (CC)         | D      |           | OPP 2017          |                           |                                                                                                                       |                    |                             |            | [386]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                      | Value | Units | Source                             | Notes |
|---------------------------------------------------|-------|-------|------------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |       |       |                                    |       |
| 10-day Health Advisory                            | 5     | mg/L  | EPA DWSHA 2018                     |       |
| Acute Health-Based Guidance Value                 | 0.01  | mg/L  | MN DOH                             |       |
| Acute Health-Based Guidance Value                 | 0.03  | mg/L  | MN DOH                             |       |
| Chronic Health-Based Guidance Value               | 0.01  | mg/L  | MN DOH                             |       |
| Lifetime Health Advisory                          | 0.07  | mg/L  | EPA DWSHA 2018                     |       |
| Maximum Allowable Concentration (MAC)             | 0.08  | mg/L  | Canadian Drinking Water Guidelines |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.01  | mg/L  | MN DOH                             |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 2200  | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 250   | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 200   | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 7.5   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 1.5   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 70    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 3.22  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 3     | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 1.25  | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0042658 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.63      | no units | TEST QSAR |       |
| Developmental toxin test | 0.056     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Metribuzin  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 | 13,512                        | 1                 | Sites              | 0.01                 | 0.1                     | 0.1                    | 0.1                       | 0.1                     | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 11,379                        | 606               | Sites              | 5.33                 | 0.001                   | 0.02                   | 0.17                      | 15.6                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,318                         | 466               | Sites              | 20                   | 0.001                   | 0.0205                 | 0.17                      | 15.6                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9,062                         | 140               | Sites              | 1.54                 | 0.002                   | 0.013                  | 0.204                     | 3.69                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 48               | 5,804,692                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 8                | 15,725                     | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 182                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - MA (Finished)                                         | 2006 - 2020 | 822                           | 1                 | Sites               | 0.12                 | 0.1                     | 0.1                    | 0.1                       | 0.1                     | ug/L        |       |
| Drinking Water Monitoring Data - WA (Finished)                                         | 2006 - 2011 | 822                           | 1                 | Sites               | 0.12                 | 0.05                    | 0.085                  | 0.223                     | 0.28                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 15                            | 3                 | Sites               | 20                   | 0.0107                  | 0.257                  | 1.63                      | 3.76                    | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 2,171                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - MA (Source)                                           | 2006 - 2020 | 78                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WA (Source)                                           | 2006 - 2011 | 997                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WI (Source)                                           | 2012-2019   | 92                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 965                           | 151               | Sites               | 16                   | 0.0018                  | 0.0319                 | 0.146                     | 6.7                     | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 3,126                         | 43                | Sites               | 1.38                 | 0.002                   | 0.0105                 | 0.0286                    | 0.319                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 4,090                         | 194               | Sites               | 4.74                 | 0.0018                  | 0.028                  | 0.139                     | 6.7                     | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 226                           | 3                 | Sites               | 1.33                 | 0.0107                  | 0.106                  | 2.4                       | 29.742                  | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 218                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 9                             | 3                 | Sites               | 33                   | 0.0107                  | 0.106                  | 2.4                       | 29.742                  | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 1,320                         | 27                | Sites               | 2.05                 | 0.006                   | 0.012                  | 0.0394                    | 0.182                   | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 3                 | Sites               | 7.89                 | 0.0159                  | 0.0184                 | 0.436                     | 0.541                   | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 4                 | Sites               | 0.58                 | 0.0038                  | 0.292                  | 0.628                     | 0.651                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                                  |      | 0.000000012                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units       | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.7541      | days        |       |
| Boiling point                                                     | OPERA QSAR | 299.501     | degree C    |       |
| Boiling point                                                     | TEST QSAR  |             |             |       |
| Vapor pressure                                                    | OPERA QSAR | 0.000000949 | mmHg        |       |
| Vapor pressure                                                    | TEST QSAR  |             |             |       |
| Solubility in water                                               | OPERA QSAR | 0.00612378  | mol/L       |       |
| Solubility in water                                               | TEST QSAR  | 0.00851138  | mol/L       |       |
| Bioconcentration factor                                           | OPERA QSAR | 2.56621     | no units    |       |
| Bioconcentration factor                                           | TEST QSAR  |             |             |       |
| Henry's Law constant                                              | OPERA QSAR | 2.17E-09    | atm-m^3/mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 1.70267     | no units    |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 124              | Kolpin, D.W., J.E. Barbash, and R.J. Gilliom. 1998. Occurrence of Pesticides in Shallow Groundwater of the United States: Initial Results from the National Water Quality Assessment Program. <i>Env. Sci. Tech.</i> 32:558-566.                                                                                                                                                                                                   |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 181              | USEPA, 2001. Regulatory Determination Support Document for Metribuzin. EPA 815 R-01-010.                                                                                                                                                                                                                                                                                                                                           |
| 184              | USEPA. 1998. R.E.D. Facts: Metribuzin. EPA Report 738-F-96-006. 7 pp. Available on the Internet at: <a href="http://www.epa.gov/oppsrrd1/REDS/">http://www.epa.gov/oppsrrd1/REDS/</a> Last modified: 8/29/2000.                                                                                                                                                                                                                    |
| 186              | USEPA. 2003. Health Effects Support Document for Metribuzin. Office of Water. EPA Report 822-R-03-004. February 2003. 84 pp.                                                                                                                                                                                                                                                                                                       |
| 239              | USEPA. 2001. Analysis of National Occurrence of the 1998 Contaminant Candidate List Regulatory Determination Priority Contaminants in Public Water Systems. Office of Water. EPA report 815-D-01-002. 77 pp.                                                                                                                                                                                                                       |
| 247              | USEPA. 2001. Occurrence of Unregulated Contaminants in Public Water Systems: An Initial Assessment. Office of Water. EPA report 815-P-00-001. Office of Water. 50 pp.                                                                                                                                                                                                                                                              |
| 386              | USEPA. 2017. Metribuzin: Draft Risk Assessment for Registration Review. EPA-HQ-OPP-2012-0487-0022. DP No. D432005. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                                      |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |



**Molybdenum**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| Name:           | Molybdenum                                                                              |
| CASRN:          | 7439-98-7                                                                               |
| DTXSID:         | <a href="#">DTXSID1024207</a>                                                           |
| Use:            | Use data for molybdenum trioxide: As steel alloy; chemical reagent; naturally-occurring |
| Chemical Notes: |                                                                                         |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxicants                              |  |
| PubMed Neurotoxicants                             |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.25                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects | 10         | 7         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect            | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 30                     | increased uric acid levels | general population | IRIS              | 1992                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 7.5                          | 90th Percentile                               | Finished Water                       | UCMR3  | 2013-2015 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
| X                 |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**Molybdenum**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units     | Assessment Source | Critical Study          | Critical Effect                                                                                      | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|-------------------------|------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.07  | mg/L      | WHO 2011          | Chappell et al. 1979    | altered urinary levels of molybdenum and copper, altered serum levels of uric acid and ceruloplasmin | general population | 33.8                        | 414        | [442]                    |       |
| Reference Dose (RfD) or Equivalent | 0.005 | mg/kg/day | IRIS 1992         | Koval'skiy et al., 1961 | increased uric acid levels                                                                           | general population | 33.8                        | 29.6       | [215]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects     | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|---------------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Endocrine, Immune, Neurological | 5                           | Murray 2019        | Reproductive, Renal,         | 40                           | Murray 2019         | 2016-04-01           | 2020-02-13         | 1086                                           | 2                                               | 34                                             | 1                                                 |

**Other Health Data**

| Data Element                                | Value  | Units | Source         | Notes |
|---------------------------------------------|--------|-------|----------------|-------|
| <b>Measured Data and Assessment Results</b> |        |       |                |       |
| 10-day Health Advisory                      | 0.08   | mg/L  | EPA DWSHA 2018 |       |
| Chronic inhalation Minimal Risk Level (MRL) | 0.0004 | mg/m³ | CDC ATSDR      |       |
| Lifetime Health Advisory                    | 0.04   | mg/L  | EPA DWSHA 2018 |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

| Data Element             | Value | Units | Source    | Notes |
|--------------------------|-------|-------|-----------|-------|
| <b>Modeled Data</b>      |       |       |           |       |
| LD50                     |       |       | TEST QSAR |       |
| Ames mutagenicity test   |       |       | TEST QSAR |       |
| Developmental toxin test |       |       | TEST QSAR |       |

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| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) | 107                          | µg/l  |       |

UCMB 4 data used in the draft CCI 5 is a partial dataset and will be complete in Dec. 2020.

**Molybdenum**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. Environmental science & technology, 52(23), 13972-13985.                                                                                |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                                                                                                                                                              |
| 215              | USEPA. 1992. Chemical Assessment Summary, Molybdenum. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, D.C.                                                                                                                                                                                                                              |
| 442              | WHO. 2011. Molybdenum in Drinking-water. Background document for development of WHO Guidelines for Drinking-water Quality. World Health Organization (WHO), Geneva, Switzerland.                                                                                                                                                                                                                                                   |

**Morphine**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Morphine                      |
| CASRN:          | 57-27-2                       |
| DTXSID:         | <a href="#">DTXSID9023336</a> |
| Use:            | narcotic analgesic            |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxicants                              |  |
| PubMed Neurotoxicants                             |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.091                      |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 7       | non-cancer effects | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 0.8                    | lowest therapeutic dose:severe pain management | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.07293                      | 90th Percentile                               | All Ambient Water                    | NWIS   | 2008-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
| X                 |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**Morphine**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|--------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                          |            |                          |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element                       | Value    | Units     | Assessment Source  | Critical Study       | Critical Effect                                | Target Population  | Exposure Factor (mL/kg-) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                          |
|------------------------------------|----------|-----------|--------------------|----------------------|------------------------------------------------|--------------------|--------------------------|----------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.000125 | mg/kg/day | FDA 2018; NIH 2018 | Actavis Pharma, Inc. | lowest therapeutic dose:severe pain management | bottle-fed infants | 151                      | 0.830                      | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug |
| Reference Dose (RfD) or Equivalent | 0.000125 | mg/kg/day | FDA 2018; NIH 2018 | Actavis Pharma, Inc. | lowest therapeutic dose:severe pain management | general population | 33.8                     | 2.90                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                            | Value       | Units     | Source              | Notes |
|---------------------------------------------------------|-------------|-----------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |           |                     |       |
| Maximum Recommended Daily Dose                          | 1.67        | mg/kg/day | FDA                 |       |
| Screening level for pharmaceutical - general population | 0.002941176 | mg/L      | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.000833333 | mg/L      | EPA Office of Water |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units | Source   | Notes |
|---------------------------------------------|-------|-------|----------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |          |       |
| LD50                                        | 335   | mg/kg | NIH HSDB | min   |
| LD50                                        | 745   | mg/kg | NIH HSDB | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0007345 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.366     | no units | TEST QSAR |       |
| Developmental toxin test | 0.915     | no units | TEST QSAR |       |

## Morphine

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   | Prevalence         |                      |                         |                        | Magnitude                 |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   | Prevalence         |                      |                         |                        | Magnitude                 |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 557                           | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 75                            | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 482                           | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   | Prevalence          |                      |                         |                        | Magnitude                 |                         |             |       |
| Furlong et al 2017 (Finished) [83]                            | 2007 - 2012 | NA                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                               |                   | Prevalence          |                      |                         |                        | Magnitude                 |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 205                           | 6                 | Sites               | 2.93                 | 0.00224                 | 0.0189                 | 0.0729                    | 0.185                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 401                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 606                           | 6                 | Sites               | 0.99                 | 0.00224                 | 0.0189                 | 0.0729                    | 0.185                   | ug/L        |       |
| Furlong et al 2017 (Ambient) [83]                             | 2007 - 2012 | NA                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                            | 7                 | Sites               | 18                   | 0.0057436               | 0.0152                 | 0.0868                    | 0.1145373               | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                       | 2013 - 2015 | 1,106                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   | Prevalence          |                      |                         |                        | Magnitude                 |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                            | 13                | Sites               | 62                   | 0.0086904               | 0.0583                 | 0.547                     | 0.5896521               | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      |                                         |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 25.9487     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 385.353     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 430.461     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 2.04E-09    | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 2.4E-09     | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000940938 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00465586  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 52.5833     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 71.2853     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 6.9E-11     | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 1.06081     | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                          |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. Environmental Science and Technology 53: 2950-2960.                                                           |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. Environmental science & technology, 51(9), 4792-4802.                    |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                          |
| 83               | Furlong, E.T., Batt, A.L., Glassmeyer, S.T., Noriega, M.C., Kolpin, D.W., Mash, H., Schenck, K.M. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States: Pharmaceuticals. Science of The Total Environment. 579 (1629-1642). |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                                     |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. Science of the Total Environment, 636, 69-79.                |



**Morphine-3-Glucuronide**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                   |
|-----------------|-----------------------------------|
| Name:           | Morphine-3-Glucuronide            |
| CASRN:          | 20290-09-9                        |
| DTXSID:         | <a href="#">DTXSID80174157</a>    |
| Use:            | Central Nervous System Stimulants |
| Chemical Notes: |                                   |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxicants                              |  |
| PubMed Neurotoxicants                             |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 |                            |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity | Prevalence | Magnitude |
|---------|----------|------------|-----------|
|         |          |            |           |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect | Target Pop. | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------|-------------|-------------------|----------------------|
|                                                          |                        |                 |             |                   |                      |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|------|
|                              |                                               |                                      |        |      |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
| X                 |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element             | Value | Units | Source    | Notes |
|--------------------------|-------|-------|-----------|-------|
| <b>Modeled Data</b>      |       |       |           |       |
| LD50                     |       |       | TEST QSAR |       |
| Ames mutagenicity test   |       |       | TEST QSAR |       |
| Developmental toxin test |       |       | TEST QSAR |       |

**Morphine-3-Glucuronide**

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**OCCURRENCE DATA****Scoring Data**

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

**Non-Scoring Data**

| Non-Nationally Representative Water Data | Date | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|------------------------------------------|------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                    |      |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                          |      |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                          |      |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                     |      |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                          |      |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                          |      |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>              |      |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                          |      |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                          |      |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water         | Date | Source                              | Value                | Units                 | Model                   | Notes                      |                           |                              |                            |             |       |
|                                          |      |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expcast exposure                                   |      |                                               |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value | Units | Notes |
|-------------------------------------------------------------------|------------|-------|-------|-------|
| Biodegradation half-life                                          | OPERA QSAR |       |       |       |
| Boiling point                                                     | OPERA QSAR |       |       |       |
| Boiling point                                                     | TEST QSAR  |       |       |       |
| Vapor pressure                                                    | OPERA QSAR |       |       |       |
| Vapor pressure                                                    | TEST QSAR  |       |       |       |
| Solubility in water                                               | OPERA QSAR |       |       |       |
| Solubility in water                                               | TEST QSAR  |       |       |       |
| Bioconcentration factor                                           | OPERA QSAR |       |       |       |
| Bioconcentration factor                                           | TEST QSAR  |       |       |       |
| Henry's Law constant                                              | OPERA QSAR |       |       |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR |       |       |       |

**Morphine-3-Glucuronide**

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| Reference<br>Number | Full Reference |
|---------------------|----------------|
|                     |                |

**Myclobutanil**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Myclobutanil                  |
| CASRN:          | 88671-89-0                    |
| DTXSID:         | <a href="#">DTXSID8024315</a> |
| Use:            | Fungicide used on fruit       |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.0004                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 5       | reproductive and developmental effects | 9          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                               | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 100                    | decreased testicular weights and increased testicular atrophy | general population | OPP               | 2019                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.04                         | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**Myclobutanil**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units     | Assessment Source | Critical Study                        | Critical Effect                                               | Target Population  | Exposure Factor (mL/kg-) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|---------------------------------------|---------------------------------------------------------------|--------------------|--------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.025 | mg/kg/day | OPP 2019          | Wolfe 1993; Shellenberger et al. 1986 | decreased testicular weights and increased testicular atrophy | general population | 33.8                     | 148        | [421]                    |       |
| Cancer Classification (CC)         | E     |           | OPP 2019          |                                       |                                                               |                    |                          |            | [421]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|--------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                          |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                | Value | Units     | Source                             | Notes |
|---------------------------------------------|-------|-----------|------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                    |       |
| Acute Human Health Benchmark                | 20    | mg/L      | EPA HHBP                           |       |
| Acute PAD                                   | 0.6   | mg/kg/day | EPA HHBP                           |       |
| Chronic Human Health Benchmark              | 0.16  | mg/L      | EPA HHBP                           |       |
| Health-Based Screening Level                | 0.16  | mg/L      | Health-based screening levels from |       |
| Population-Adjusted Dose (PAD)              | 0.025 | mg/kg/day | EPA HHBP                           |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 1600      | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 2290      | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 393.5     | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 9.8400002 | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 2.5       | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 93.77     | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 13.57     | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 150       | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic LOAEL                                 | 5         | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 0.25      | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 50        | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0057677 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.709     | no units | TEST QSAR |       |
| Developmental toxin test | 0.554     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
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EPA - Office of Water

Myclobutanil

CCL 5 Contaminant Information Sheet

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**OCCURRENCE DATA**

**Scoring Data**

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 4,941                         | 170               | Sites              | 3.44                 | 0.00033                 | 0.011                  | 0.04                      | 0.668                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 581                           | 150               | Sites              | 26                   | 0.00033                 | 0.011                  | 0.04                      | 0.668                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 4,360                         | 20                | Sites              | 0.46                 | 0.00468                 | 0.012                  | 0.0346                    | 0.266                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 40               | 103,368                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 6                | 0.98                       | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

**Non-Scoring Data**

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 2                 | Sites               | 12                   | 0.0027                  | 0.0188                 | 0.0188                    | 0.0188                  | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 903                           | 106               | Sites               | 12                   | 0.00092                 | 0.013                  | 0.309                     | 24                      | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 2,510                         | 10                | Sites               | 0.4                  | 0.008                   | 0.0127                 | 0.0822                    | 0.146                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 3,412                         | 116               | Sites               | 3.4                  | 0.00092                 | 0.013                  | 0.282                     | 24                      | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 6                 | Sites               | 2.62                 | 0.0027                  | 0.0188                 | 0.083                     | 0.083                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 2                 | Sites               | 0.91                 | 0.004828                | 0.0439                 | 0.0752                    | 0.083                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 4                 | Sites               | 33                   | 0.0027                  | 0.0188                 | 0.083                     | 0.083                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 24                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 2                 | Sites               | 5.26                 | 0.0497                  | 0.161                  | 0.251                     | 0.273                   | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 3                 | Sites               | 0.43                 | 0.0061                  | 0.0098                 | 0.0116                    | 0.012                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 8.75E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.35213     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 337.658     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 396.923     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00000101  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000000126 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000735975 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0000383   | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 33.7291     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 103.514     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000000439 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.98801     | no units                |       |

**Myclobutanil**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 421              | USEPA. 2019. Myclobutanil: Human Health Risk Assessment for Registration Review. EPA-HQ-OPP-2015-0053-0018. DP No. D448816. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                             |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |



**N,N-Diethyl-m-toluamide (DEET)**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                 |
|-----------------|---------------------------------|
| Name:           | N,N-Diethyl-m-toluamide (DEET)  |
| CASRN:          | 134-62-3                        |
| DTXSID:         | <a href="#">DTXSID2021995</a>   |
| Use:            | Broad-spectrum insect repellent |
| Chemical Notes: |                                 |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 |                            |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity | Prevalence | Magnitude |
|---------|----------|------------|-----------|
|         |          | 10         | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect | Target Pop. | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------|-------------|-------------------|----------------------|
|                                                          |                        |                 |             |                   |                      |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.22                         | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**N,N-Diethyl-m-toluamide (DEET)**  
CCL 5 Contaminant Information Sheet  
**HEALTH EFFECTS DATA**

EPA-OGWDW and OST

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**Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units     | Assessment Source | Critical Study                                                                                                                        | Critical Effect                                                           | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------|-------|-----------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------|-----------------------------|------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 1     | mg/kg/day | ATSDR 2017        | EPA. 1989. [EPA memorandum 007645 from Whang Phang, Subject: Review of a two-generation reproduction on DEET, dated 13 December 1989] | reduced body weight in F1 and F2 male and female pups on lactation day 21 | lactating women   | 46.9                        | 4260       | [35]                     |                                                                                                                                                                                                                                                                                                                                                                     |
|                                    |       |           | OPP 2014          |                                                                                                                                       |                                                                           |                   |                             |            | [331]                    | NOTE: There is no HRL for DEET because there are no toxicity values provided in the OPP assessment. The document states "no dietary or occupational exposures are anticipated, residential and aggregate were not risks of concern due to the lack of hazard." An ATSDR Toxicological Profile exists for this compound. See entry in "other qualifying information" |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                      | Value | Units | Source | Notes |
|---------------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b>       |       |       |        |       |
| Acute Health-Based Guidance Value                 | 0.2   | mg/L  | MN DOH |       |
| Chronic Health-Based Guidance Value               | 0.2   | mg/L  | MN DOH |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.2   | mg/L  | MN DOH |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                      | Value | Units     | Source                          | Notes |
|---------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |       |           |                                 |       |
| LD50                                              | 1584  | mg/kg     | NIH HSDB                        | min   |
| LD50                                              | 1950  | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                             | 1000  | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                             | 25    | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                             | 100   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                             | 500   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxicant in vitro assays tested | 1.51  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                  | 304   | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                  | 61    | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0091411 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | -0.042    | no units | TEST QSAR |       |
| Developmental toxin test | 0.57      | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

N,N-Diethyl-m-tolamide (DEET)  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

July 2021

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 538                           | 114               | Sites               | 21                   | 0.01                    | 0.06                   | 0.22                      | 2.2                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 60                            | 43                | Sites               | 72                   | 0.01                    | 0.07                   | 0.24                      | 2.2                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 478                           | 71                | Sites               | 15                   | 0.01                    | 0.02                   | 0.094                     | 0.29                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Finished) [86]                                                  | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Padhye et al. 2013 (Finished) [155]                                                    | 2009 - 2010 | 8                             | 8                 | Samples             | 100                  | 5e-07 +/- 1e-07         | 1.19e-05               |                           | 2.4e-05 +/- 8.2e-06     | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 1                 | Sites               | 100                  | 0.1                     | 0.1                    | 0.1                       | 0.1                     | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 710                           | 522               | Sites               | 74                   | 0.01                    | 0.05                   | 0.22                      | 5.07                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 683                           | 244               | Sites               | 36                   | 0.01                    | 0.03                   | 0.358                     | 7.9                     | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 1,393                         | 766               | Sites               | 55                   | 0.01                    | 0.05                   | 0.23                      | 7.9                     | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 26                            | 12                | Sites               | 46                   | 0.0106                  | 0.146                  | 0.473                     | 0.912                   | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                                                   | 2007 - 2012 | 25                            | NA                | Sites               | 4                    |                         | 0.098                  |                           | 0.098                   | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 22                | Sites               | 58                   | 0.0035                  | 0.0311                 | 0.0899                    | 0.119                   | ug/L        |       |
| Padhye et al. 2013 (Ambient) [155]                                                     | 2009 - 2010 | 8                             | 8                 | Samples             | 100                  | 2.33e-05 +/- 3e-06      | 0.0001224              |                           | 0.0002557 +/- 6.25e-05  | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 2                 | Sites               | 100                  |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                                                   | 2011 - 2017 | 21                            | 17                | Sites               | 81                   | 0.085                   | 0.195                  | 0.449                     | 1                       | ug/L        |       |
| <b>Estimated Concentration in Water</b>                                                | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 0.00000017                              |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) | < LOD                        | ug/l  |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.35701     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 287.874     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 307.376     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.0019251   | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.00031989  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00200679  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0209894   | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 3.31548     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 10.3276     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000000145 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.25645     | no units                |       |

**N,N-Diethyl-m-toluamide (DEET)**

CCL 5 Contaminant Information Sheet

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                         |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 35               | ATSDR. 2017. Toxicological Profile for DEET (N,N-Diethyl-Meta-Toluamide). U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                                                  |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                       |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922).                                |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                     |
| 155              | Padhye, L.P., Yao, H., Kung'u, F.T., and Huang, C.H. Year-long evaluation on the occurrence and fate of pharmaceuticals, personal care products, and endocrine disrupting chemicals in an urban drinking water treatment plant. 2014. <i>Water Research</i> 51 (2014) 266-276.                                                         |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                                       |
| 331              | USEPA. 2014. DEET (N,N-diethyl-meta-toluamide). Revised Human Health Risk Assessment in Support of Registration Review. EPA-HQ-OPP-2012-0162-0003. DP No. D413872. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                          |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society. |

## Naled

CCL 5 Contaminant Information Sheet

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                  |
|-----------------|----------------------------------|
| Name:           | Naled                            |
| CASRN:          | 300-76-5                         |
| DTXSID:         | <a href="#">DTXSID1024209</a>    |
| Use:            | Insecticide; veterinary medicine |
| Chemical Notes: |                                  |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxicants                              | X |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.02                       |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects | 3          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                 | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 10                     | brain cholinesterase inhibition | general population | OPP               | 2009                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.1972                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

Naled

CCL 5 Contaminant Information Sheet

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units     | Assessment Source | Critical Study     | Critical Effect                 | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|--------------------|---------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.002 | mg/kg/day | OPP 2006          | Batham et al. 1984 | brain cholinesterase inhibition | general population | 33.8                        | 11.8       | [266]                    |       |
| Cancer Classification (CC)         | E     |           | OPP 2006          |                    |                                 |                    |                             |            | [266]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 0.07  | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.01  | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.01  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.01  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.002 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 430   | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 92    | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 2     | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 40    | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 0.2   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 10    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 24.11 | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0002851 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.559     | no units | TEST QSAR |       |
| Developmental toxin test |           |          | TEST QSAR |       |

## Naled

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,698                               | 4                    | Sites                 | 0.24                    | 0.004                      | 0.0221                    | 0.197                        | 0.367                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 322                                 | 3                    | Sites                 | 0.93                    | 0.004                      | 0.0173                    | 0.0253                       | 0.0274                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,376                               | 1                    | Sites                 | 0.07                    | 0.367                      | 0.367                     | 0.367                        | 0.367                      | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 6                | 293,220                      | 2016 | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) | 1                   | 10                            | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 1                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 3                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 299                                 | 2                    | Sites                  | 0.67                    | 0.0578                     | 0.0595                    | 0.0605                       | 0.0612                     | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 528                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 827                                 | 2                    | Sites                  | 0.24                    | 0.0578                     | 0.0595                    | 0.0605                       | 0.0612                     | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 2,547                               | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 584                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                       | <b>Value</b>         | <b>Units</b>           | <b>Model</b>            | <b>Notes</b>               |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Exposure                                           |      | 0.00000122                                    |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 4.13863     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 275.202     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 291.332     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.000367639 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.0069024   | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.00699769  | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.00360579  | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 3.99441     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 5.90201     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.00000793  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 1.56699     | no units                |       |

**Naled**

CCL 5 Contaminant Information Sheet

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> .                                                                                                       |
| 266              | USEPA. 2006. Finalization of Interim Reregistration Eligibility Decisions (IREDs) and Interim Tolerance Reassessment and Risk Management Decisions (TREDs) for the Organophosphate Pesticides, and Completion of the Tolerance Reassessment and Reregistration Eligibility Process for the Organophosphate Pesticides. Interim Reregistration Eligibility Decision for Naled. EPA-HQ-OPP-2002-0307-0002. EPA 738-R-02-008. U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Washington, D.C. |
| 301              | USEPA. 2009. Naled. Human Health Assessment Scoping Document in Support of Registration Review. EPA-HQ-OPP-2009-0053-0005. DP No. D356244. Office of Prevention, Pesticides and Toxic Substances, United States Environmental Protection Agency, Washington, D.C.                                                                                                                                                                                                                                                                        |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                                                                                                                          |



## Naphthalene

CCL 5 Contaminant Information Sheet

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                                         |
|-----------------|---------------------------------------------------------|
| Name:           | Naphthalene                                             |
| CASRN:          | 91-20-3                                                 |
| DTXSID:         | <a href="#">DTXSID8020913</a>                           |
| Use:            | Former pesticide; chemical intermediate; moth repellent |
| Chemical Notes: |                                                         |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.012                      |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 4       | non-cancer effects | 7          | 6         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 600                    | decreases in body weights and body weight gains, renal effects | general population | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 7.4                          | 90th Percentile                               | Finished Water                       | UCM1   | 1988-1992 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1 | RD 2           | RD 3           |
|------|----------------|----------------|
| X    | Not Applicable | Not Applicable |

## Basis

Naphthalene regulation does not represent a meaningful opportunity for health risk reduction in persons served by public water systems. While there is evidence that naphthalene may cause adverse health effects in humans at high doses, specifically hemolytic anemia [a,b], it is unlikely that it will occur in drinking water at frequencies or concentrations that are of public health concern. The UCM Round 2 survey data estimates only 0.002% of the population served by PWS are exposed to concentrations greater than ½ the HRL and no exposures at concentrations greater than an HRL of 140 µg/L [c].

[a] Gidron & Leurer, 1956 [84]; [b] ATSDR, 1995 [3]; [c] USEPA, 1999 [232]; as cited in USEPA, 2001 [182]

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Naphthalene

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                             | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|---------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.1   | mg/kg/day | OPP 2018          | NTP 1980       | decreases in body weights and renal effects | general population | 33.8                        | 592        | [405]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                      | Value          | Units          | Source                         | Notes |
|---------------------------------------------------|----------------|----------------|--------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |                |                |                                |       |
| 10-day Health Advisory                            | 0.5            | mg/L           | EPA DWSHA 2018                 |       |
| Acute Health-Based Guidance Value                 | 0.07           | mg/L           | MN DOH                         |       |
| Acute Health-Based Guidance Value                 | 0.07           | mg/L           | MN DOH                         |       |
| Acute Minimal Risk Level (MRL)                    | 0.6            | mg/kg/day      | CDC ATSDR                      |       |
| Benchmark                                         | 0.017          | mg/L           | CalEPA OEHHA Chemical Database |       |
| Cancer Slope Factor (CSF)                         | 0.12           | (mg/kg/day)^-1 | CalEPA OEHHA Chemical Database |       |
| Chronic Health-Based Guidance Value               | 0.07           | mg/L           | MN DOH                         |       |
| Chronic inhalation Minimal Risk Level (MRL)       | 0.0007         | ppm            | CDC ATSDR                      |       |
| Inhalation Unit Risk (IUR)                        | 0.000034       | ug/m^3         | CalEPA OEHHA Chemical Database |       |
| Intermediate Minimal Risk Level (MRL)             | 0.6            | mg/kg/day      | CDC ATSDR                      |       |
| Lifetime Health Advisory                          | 0.1            | mg/L           | EPA DWSHA 2018                 |       |
| Reference Concentration (RfC)                     | 0.003          | mg/m^3         | EPA IRIS                       |       |
| Reference Concentration (RfC)                     | 9              | ug/m^3         | CalEPA OEHHA Chemical Database |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.07           | mg/L           | MN DOH                         |       |
| Cancer Classification (CC)                        | 2B             | no units       | WHO IARC                       |       |
| Cancer Classification (CC)                        | Female.Mice NT | no units       | HHS NTP                        |       |
| Cancer Classification (CC)                        | Female.Mice SE | no units       | HHS NTP                        |       |
| Cancer Classification (CC)                        | Female.Rats NT | no units       | HHS NTP                        |       |
| Cancer Classification (CC)                        | Female.Rats P  | no units       | HHS NTP                        |       |
| Cancer Classification (CC)                        | Male.Mice NE   | no units       | HHS NTP                        |       |
| Cancer Classification (CC)                        | Male.Mice NT   | no units       | HHS NTP                        |       |
| Cancer Classification (CC)                        | Male.Rats NT   | no units       | HHS NTP                        |       |
| Cancer Classification (CC)                        | Male.Rats P    | no units       | HHS NTP                        |       |

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 2600  | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 490   | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 50    | mg/kg/day | EPA Toxicity Reference Database |       |
| Percent of active toxcast in vitro assays tested | 2.54  | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0109648 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | -0.01     | no units | TEST QSAR |       |
| Developmental toxin test | 0.32      | no units | TEST QSAR |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Naphthalene

CCL 5 Contaminant Information Sheet

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OCCURRENCE DATA

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                                |             |                                     | Prevalence           |                       |                         |                            |                           | Magnitude                    |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 | 22,923                              | 173                  | Sites                 | 0.75                    | 0.07                       | 0.73                      | 3.08                         | 90                         | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 | 13,452                              | 159                  | Sites                 | 1.18                    | 0.03                       | 1                         | 7.4                          | 906                        | ug/L        |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                                |             |                                     | Prevalence           |                       |                         |                            |                           | Magnitude                    |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 7,850                               | 68                   | Sites                 | 0.87                    | 0.008                      | 0.2                       | 1.02                         | 70                         | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 310                                 | 30                   | Sites                 | 9.68                    | 0.008                      | 0.1                       | 0.3                          | 1.12                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 7,540                               | 38                   | Sites                 | 0.5                     | 0.048                      | 0.42                      | 5.69                         | 70                         | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) | 49               | 2,359,983                     | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) | 100M - 250M                  |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     | Prevalence           |                        |                         |                            |                           | Magnitude                    |                            |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 366                                 | 3                    | Sites                  | 0.82                    | 0.003                      | 0.0105                    | 0.93                         | 7                          | ug/L        |       |
| Drinking Water Monitoring Data - MA (Finished)                | 2006 - 2020 | 887                                 | 14                   | Sites                  | 1.58                    | 0.5                        | 1.3                       | 2.03                         | 3.1                        | ug/L        |       |
| Drinking Water Monitoring Data - WA (Finished)                | 2006 - 2011 | 1,188                               | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     | Prevalence           |                        |                         |                            |                           | Magnitude                    |                            |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 3,888                               | 21                   | Sites                  | 0.54                    | 0.001                      | 0.565                     | 3.21                         | 5.8                        | ug/L        |       |
| Drinking Water Monitoring Data - MA (Source)                  | 2006 - 2020 | 131                                 | 5                    | Sites                  | 3.82                    | 0.5                        | 1.2                       | 2.58                         | 4.5                        | ug/L        |       |
| Drinking Water Monitoring Data - PA (Source)                  | 2006 - 2011 | 15                                  | 1                    | Sites                  | 6.67                    | 1.08                       | 1.16                      | 1.23                         | 1.25                       | ug/L        |       |
| Drinking Water Monitoring Data - WA (Source)                  | 2006 - 2011 | 1,665                               | 2                    | Sites                  | 0.12                    | 0.66                       | 34.4                      | 35.8                         | 36                         | ug/L        |       |
| Drinking Water Monitoring Data - WI (Source)                  | 2012-2019   | 101                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 978                                 | 159                  | Sites                  | 16                      | 0.008                      | 0.02                      | 0.07                         | 6                          | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 4,211                               | 87                   | Sites                  | 2.07                    | 0.007                      | 0.096                     | 43.4                         | 16000                      | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 5,186                               | 246                  | Sites                  | 4.74                    | 0.007                      | 0.0205                    | 0.282                        | 16000                      | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                                  | 3                    | Sites                  | 7.89                    | 0.0162                     | 0.025                     | 0.0277                       | 0.0284                     | ug/L        |       |
| Arnold et al. 2016 (Unfiltered) [7]                           | 2012 - 2013 | 685                                 | 1                    | Sites                  | 0.15                    | 0.78                       | 0.78                      | 0.78                         | 0.78                       | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     | Prevalence           |                        |                         |                            |                           | Magnitude                    |                            |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                                  | 2                    | Sites                  | 9.52                    | 0.021                      | 0.025                     | 0.0282                       | 0.029                      | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg-<br>bw/day) | Notes |
|----------------------------------------------------|------|------------------------------------------------|-------|
| Expocast exposure                                  |      | 0.0000737                                      |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 5.12244     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 221.854     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 233.31      | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.0632206   | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.057544    | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000165649 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.00030903  | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 89.6573     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 244.67      | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.000415844 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 3.32388     | no units                |       |

**Naphthalene**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3                | Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological Profile for Naphthalene (Update). Atlanta: Agency for Toxic Substances and Disease Registry. 200pp.                                                                                                                                                                                                                                                  |
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. Environmental science & technology, 51(9), 4792-4802.                                                                                                                                               |
| 84               | Gidron, E. and J. Leurer. 1956. Naphthalene Poisoning. Lancet. 4:228-230 (as cited in ATSDR, 1995).                                                                                                                                                                                                                                                                                                                                |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. Science of the Total Environment, 636, 69-79.                                                                                                                                           |
| 182              | USEPA, 2001. Regulatory Determination Support Document for Naphthalene. EPA 815 R-01-008.                                                                                                                                                                                                                                                                                                                                          |
| 232              | USEPA. 1999. A Review of Contaminant Occurrence in Public Water Systems. Office of Water. EPA Report 816-R-99-006. 78 pp.                                                                                                                                                                                                                                                                                                          |
| 405              | USEPA. 2018. Naphthalene: Human Health Risk Assessment in Support of Registration Review. EPA-HQ-OPP-2016-0113-0018. DP No. D440842. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                    |

**Nicotine**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                   |
|-----------------|---------------------------------------------------|
| Name:           | Nicotine                                          |
| CASRN:          | 54-11-5                                           |
| DTXSID:         | <a href="#">DTXSID1020930</a>                     |
| Use:            | Restricted use pesticide; component in cigarettes |
| Chemical Notes: |                                                   |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              | X |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              | X |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 | X |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.78                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 8       | non-cancer effects | 10         | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                                     | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 0.2                    | lowest therapeutic dose: smoking cessation/reduces withdrawal symptoms, including nicotine craving associated with quitting smoking | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.1566                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**Nicotine**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element                       | Value    | Units     | Assessment Source  | Critical Study      | Critical Effect                                                                                                                    | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                 |
|------------------------------------|----------|-----------|--------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.000025 | mg/kg/day | FDA 2018; NIH 2018 | Wal-Mart Stores Inc | lowest therapeutic dose:smoking cessation/reduces withdrawal symptoms, including nicotine craving associated with quitting smoking | bottle-fed infants | 151                         | 0.170                      | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 0.000025 | mg/kg/day | FDA 2018; NIH 2018 | Wal-Mart Stores Inc | lowest therapeutic dose:smoking cessation/reduces withdrawal symptoms, including nicotine craving associated with quitting smoking | general population | 33.8                        | 0.590                      | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                            | Value       | Units | Source              | Notes |
|---------------------------------------------------------|-------------|-------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |       |                     |       |
| Screening level for pharmaceutical - general population | 0.000588235 | mg/L  | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.000166667 | mg/L  | EPA Office of Water |       |

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 188   | mg/kg   | NIH HSDB                | max   |
| LD50                                             | 24    | mg/kg   | NIH HSDB                | min   |
| Percent of active toxcast in vitro assays tested | 2.39  | percent | EPA Chemistry Dashboard |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0053088 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.047     | no units | TEST QSAR |       |
| Developmental toxin test | 0.645     | no units | TEST QSAR |       |



**Nicotine**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                  |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985. |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                                                                                  |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922).                                                         |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                                                                                             |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                                                                |
| 433              | Uslu, M., Jasim, S., Arvai, A., Bewtra, J. and Biswas, N., 2013. A Survey of Occurrence and Risk Assessment of Pharmaceutical Substances in the Great Lakes Basin. <i>Ozone: Science &amp; Engineering</i> , 35(4), pp.249-262.                                                                                                                                 |



**Nonylphenol**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                                                                                    |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------|
| Name:           | Nonylphenol                                                                                                                        |
| CASRN:          | 25154-52-3                                                                                                                         |
| DTXSID:         | <a href="#">DTXSID3021857</a>                                                                                                      |
| Use:            | In the preparation of lubricating oil additives, resins, plasticizers, surface active agents; antioxidants for plastics and rubber |
| Chemical Notes: |                                                                                                                                    |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.15                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects | 9          | 7         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect      | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------|--------------------|-------------------|----------------------|
| SL                                                       | 30                     | renal mineralization | general population | MDH               | 2015                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 4.4                          | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Nonylphenol

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value  | Units     | Assessment Source | Critical Study         | Critical Effect      | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|------------------------|----------------------|--------------------|-----------------------------|----------------------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0049 | mg/kg/day | MDH 2015          | NTP, 1997/Chapin, 1999 | Renal Mineralization | general population | 33.8                        | 29.0                       | [136]                    |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Metabolic, Systemic         | 0.00002                     | Yu, 2018           | Endocrine                    | 456                          | Masutomi, 2004      |                      | 2020-01-28         | 2685                                           | 64                                              | 16                                             | 50                                                |

## Other Health Data

| Data Element                                      | Value | Units | Source | Notes |
|---------------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b>       |       |       |        |       |
| Acute Health-Based Guidance Value                 | 0.1   | mg/L  | MN DOH |       |
| Chronic Health-Based Guidance Value               | 0.02  | mg/L  | MN DOH |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.04  | mg/L  | MN DOH |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 1600  | mg/kg   | NIH HSDB                | min   |
| LD50                                             | 1620  | mg/kg   | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 26.88 | percent | EPA Chemistry Dashboard | min   |
| Percent of active toxcast in                     | 38.23 | percent | EPA Chemistry Dashboard | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0116681 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | -0.104    | no units | TEST QSAR |       |
| Developmental toxin test | 0.533     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Nonylphenol

CCL 5 Contaminant Information Sheet

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**OCCURRENCE DATA**

**Scoring Data**

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 567                           | 45                | Sites              | 7.94                 | 0.3                     | 1.85                   | 4.4                       | 13                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 88                            | 43                | Sites              | 49                   | 0.3                     | 1.85                   | 4.4                       | 13                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 479                           | 2                 | Sites              | 0.42                 | 1.5                     | 2.35                   | 2.86                      | 3.2                     | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) | 24               | 42,754                     | Chemical Data Reporting (CDR) Results (EPA) (2016) | 100M - 250M                  |

**Non-Scoring Data**

| Non-Nationally Representative Water Data      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|-----------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Finished) [86]         | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Padhye et al. 2013 (Finished) [155]           | 2009 - 2010 | 8                             | 8                 | Samples             | 100                  | 1.24e-05 +/- 5.3e-06    | 1.95e-05               |                           | 6.06e-05 +/- 1.92e-05   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153] | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Ambient) [86]          | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]            | 2012 - 2014 | 38                            | 10                | Sites               | 26                   | 0.105                   | 0.278                  | 0.448                     | 0.461                   | ug/L        |       |
| Padhye et al. 2013 (Ambient) [155]            | 2009 - 2010 | 8                             | 8                 | Samples             | 100                  | 5.34e-05 +/- 5.8e-06    | 8.32e-05               |                           | 0.0001856 +/- 2e-05     | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]  | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]          | 2011 - 2017 | 21                            | 17                | Sites               | 81                   | 1.1                     | 1.1                    | 1.1                       | 1.1                     | ug/L        |       |
| <b>Estimated Concentration in Water</b>       | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 0.000000872                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|----------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.94705    | days                    |       |
| Boiling point                                                  | OPERA QSAR | 269.167    | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 316.679    | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00114475 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000034   | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0000344  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00000575 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 431.548    | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 96.8278    | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.0000106  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 5.68641    | no units                |       |

**Nonylphenol**

CCL 5 Contaminant Information Sheet

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                          |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.        |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922). |
| 136              | MDH. 2015. Toxicological Summary for p-Nonylphenol, branched isomers. Minnesota Department of Health (MDH), Environmental Health Division, Health Risk Assessment Unit, St Paul, MN.                                                                                                                    |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                      |
| 155              | Padhye, L.P., Yao, H., Kung'u, F.T., and Huang, C.H. Year-long evaluation on the occurrence and fate of pharmaceuticals, personal care products, and endocrine disrupting chemicals in an urban drinking water treatment plant. 2014. <i>Water Research</i> 51 (2014) 266-276.                          |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.        |

## Norflurazon

CCL 5 Contaminant Information Sheet

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Norflurazon                   |
| CASRN:          | 27314-13-2                    |
| DTXSID:         | <a href="#">DTXSID8024234</a> |
| Use:            | Herbicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.049                      |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects | 9          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                                    | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 9                      | increased incidence of thyroid colloid/vacuoles and epithelial desquamation, increased liver weight, ALP, and cholesterol in males | general population | OPP               | 2017                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.44                         | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

## Basis

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Norflurazon

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study        | Critical Effect                                                                                                                    | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0015 | mg/kg/day | OPP 2017          | Klotzsche et al. 1973 | increased incidence of thyroid colloid/vacuoles and epithelial desquamation, increased liver weight, ALP, and cholesterol in males | general population | 33.8                        | 8.88       | [387]                    |       |
| Cancer Classification (CC)         | C      |           | OPP 2017          |                       |                                                                                                                                    |                    |                             |            | [387]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 0.8   | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.03  | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.096 | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.096 | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.015 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 8000  | mg/kg     | NIH HSDB                        |       |
| LOAEL                                            | 102.5 | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 4.77  | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 1.58  | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 81.7  | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 7.86  | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0101391 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.227     | no units | TEST QSAR |       |
| Developmental toxin test | 0.941     | no units | TEST QSAR |       |

**Norflurazon**  
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**OCCURRENCE DATA**

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### Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 7,803                         | 217               | Sites              | 2.78                 | 0.00025                 | 0.021                  | 0.44                      | 26.5                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 1,222                         | 107               | Sites              | 8.76                 | 0.00025                 | 0.02                   | 0.36                      | 7.3                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 6,581                         | 110               | Sites              | 1.67                 | 0.00029                 | 0.042                  | 1.06                      | 26.5                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 19               | 202,807                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

### Non-Scoring Data

| Non-Storing Data                                                                       |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|----------------------------------------------------------------------------------------|--|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Non-Nationally Representative Water Data                                               |  | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|                                                                                        |  |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Finished Water                                                                         |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WA (Finished)                                         |  | 2006 - 2011 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           |  | 2001 - 2013 | 17                            | 2                 | Sites               | 12                   | 0.0313                  | 0.0313                 | 0.0928                    | 0.096                   | ug/L        |       |
|                                                                                        |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |  |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Ambient Water                                                                          |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WA (Source)                                           |  | 2006 - 2011 | 4                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          |  | 2008 - 2017 | 475                           | 21                | Sites               | 4.42                 | 0.00035                 | 0.00798                | 0.155                     | 0.53                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            |  | 2008 - 2017 | 1,056                         | 19                | Sites               | 1.8                  | 3.00E - 04              | 0.03                   | 0.828                     | 1.49                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              |  | 2008 - 2017 | 1,531                         | 40                | Sites               | 2.61                 | 3.00E - 04              | 0.02                   | 0.53                      | 1.49                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 |  | 2001 - 2013 | 229                           | 9                 | Sites               | 3.93                 | 0.007992                | 0.0313                 | 0.0992                    | 0.352                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        |  | 2001 - 2013 | 219                           | 6                 | Sites               | 2.74                 | 0.007992                | 0.0248                 | 0.222                     | 0.352                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          |  | 2001 - 2013 | 12                            | 3                 | Sites               | 25                   | 0.0313                  | 0.0313                 | 0.09                      | 0.132                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] |  | 1990 - 2018 | 1,090                         | 125               | Sites               | 11                   | 0.05                    | 0.13                   | 0.424                     | 1.49                    | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     |  | 2012 - 2014 | 38                            | 2                 | Sites               | 5.26                 | 0.0137                  | 0.0206                 | 0.026                     | 0.0274                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      |  | 2012 - 2013 | 690                           | 12                | Sites               | 1.74                 | 3e-04                   | 0.00195                | 0.045                     | 0.0563                  | ug/L        |       |
|                                                                                        |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |  |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
|                                                                                        |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       |  | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| ExpoCast exposure                                  |      | 0.000000108                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMB 4 data used in the draft CCI 5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.54354     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 329.74      | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 355.301     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.00016561  | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.000000708 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000311995 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0000906   | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 22.9102     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  |             |                         |       |
| Henry's Law constant                                              | OPERA QSAR | 1.18E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 2.43139     | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 387              | USEPA. 2017. Norflurazon: Draft Human Health Risk Assessment in Support of Registration Review. EPA-HQ-OPP-2012-0565-0025. DP No. D432685. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                              |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |



**o-Toluidine**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                                 |
|-----------------|---------------------------------------------------------------------------------|
| Name:           | o-Toluidine                                                                     |
| CASRN:          | 95-53-4                                                                         |
| DTXSID:         | <a href="#">DTXSID1026164</a>                                                   |
| Use:            | intermediate in the manufacture of dyes, rubber, pharmaceuticals and pesticides |
| Chemical Notes: |                                                                                 |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxics                                 |  |
| PubMed Neurotoxics                                |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.031                      |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 4       | carcinogen with linear MOA | 8          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                         | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 2                      | subcutaneous fibromas and fibrosarcomas | general population | PPRTV             | 2012                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.06164                      | 90th Percentile                               | Finished Water                       | UCMR4  | 2018-2019 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element               | Value | Units          | Assessment Source | Critical Study         | Critical Effect                                  | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|----------------------------|-------|----------------|-------------------|------------------------|--------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Cancer Slope Factor (CSF)  | 0.016 | (mg/kg/day)^-1 | PPRTV 2012        | Weisburger et al. 1978 | subcutaneous fibromas and fibrosarcomas in males | general population | 33.8                        | 1.85       | [328]                    |       |
| Cancer Classification (CC) | L     |                | PPRTV 2012        |                        |                                                  |                    |                             |            | [328]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Systemic                    | 226.6                       | Toyoda, 2019       | Renal                        | 226.6                        | Toyoda, 2019        | 2011-12-01           | 2020-04-06         | 73                                             | 1                                               | 5                                              | 1                                                 |

## Other Health Data

| Data Element                                | Value    | Units          | Source                         | Notes |
|---------------------------------------------|----------|----------------|--------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |          |                |                                |       |
| Cancer Classification (CC)                  | 1        | no units       | WHO IARC                       |       |
| Cancer Slope Factor (CSF)                   | 0.18     | (mg/kg/day)^-1 | CalEPA OEHHA Chemical Database |       |
| Inhalation Unit Risk (IUR)                  | 0.000051 | ug/m^3         | CalEPA OEHHA Chemical Database |       |
| Subchronic Provisional RfD                  | 0.02     | mg/kg/day      | EPA PPRTV                      |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 300   | mg/kg   | NIH HSDB                | min   |
| LD50                                             | 940   | mg/kg   | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 1.47  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0067298 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.335     | no units | TEST QSAR |       |
| Developmental toxin test | 0.559     | no units | TEST QSAR |       |

## o-Toluidine

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 | 3,678                         | 67                | Sites               | 1.82                 | 0.007                   | 0.012                  | 0.0616                    | 0.38                    | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) | 10               | 6,328                      | Chemical Data Reporting (CDR) Results (EPA) (2016) | 50M - 100M                   |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 21                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 15                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 36                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                              | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.00000421                              |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value     | Units                   | Notes |
|----------------------------------------------------------------|------------|-----------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.81183   | days                    |       |
| Boiling point                                                  | OPERA QSAR | 212.346   | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 206.895   | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.177328  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.134586  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.182954  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0475335 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 4.90019   | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 6.54636   | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.0000019 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 1.4043    | no units                |       |

**o-Toluidine**

CCL 5 Contaminant Information Sheet

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| Reference Number | Full Reference                                                                                                                                                                                                                                                  |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 328              | USEPA. 2012. Provisional Peer-Reviewed Toxicity Values for o-Toluidine. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH. |

**Oxadiazon**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Oxadiazon                     |
| CASRN:          | 19666-30-9                    |
| DTXSID:         | <a href="#">DTXSID3024239</a> |
| Use:            | Herbicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 120                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 4       | carcinogen with linear MOA | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.4                    | increase in liver adenomas and/or carcinomas combined in males | general population | OPP               | 2014                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|------|
| 46.3                         |                                               | EDWC SW Chronic                      | OPP    | 2020 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**Oxadiazon**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element               | Value  | Units                     | Assessment Source | Critical Study | Critical Effect                                                | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                                                     |
|----------------------------|--------|---------------------------|-------------------|----------------|----------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Cancer Slope Factor (CSF)  | 0.0711 | (mg/kg/day) <sup>-1</sup> | OPP 2014          | Shirasu 1987   | increase in liver adenomas and/or carcinomas combined in males | general population | 33.8                        | 0.416      | [333]                    | NOTE: a non-cancer toxicity value was not provided in this assessment because there are no food or feed uses of oxadiazon |
| Cancer Classification (CC) | L      |                           | OPP 2014          |                |                                                                |                    |                             |            | [333]                    | NOTE: a non-cancer toxicity value was not provided in this assessment because there are no food or feed uses of oxadiazon |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 3500  | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 5000  | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 180   | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 3.5   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 0.44  | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 60    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 21.59 | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 100   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic LOAEL                                 | 25    | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 25    | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0017989 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.434     | no units | TEST QSAR |       |
| Developmental toxin test | 0.874     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
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EPA - Office of Water

Oxadiazon  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date                    | Number of PWS/ Sites/ Samples    | Number of Detects | PWS/ Sites/ Samples                                | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects)  | 90th Percentile (Detects)         | Maximum Conc. (Detects)                            | Conc. Units | Notes                               |
|----------------------------------------------------------------|-------------------------|----------------------------------|-------------------|----------------------------------------------------|----------------------|-------------------------|-------------------------|-----------------------------------|----------------------------------------------------|-------------|-------------------------------------|
| <b>Finished Water</b>                                          |                         |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| <b>Ambient Water</b>                                           |                         |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| <b>Pesticide Application Data</b>                              | <b>Number of States</b> | <b>Amount Applied (lbs/year)</b> | <b>Date</b>       | <b>Toxic Release Data</b>                          |                      |                         | <b>Number of States</b> | <b>Amount Released (lbs/year)</b> | <b>Chemical Production Data</b>                    |             | <b>Production Volume (lbs/year)</b> |
| Estimated Annual Agricultural Pesticide Use (USGS)             | 1                       | 1,328                            | 2016              | Toxic Release Inventory (TRI) Program (EPA) (2016) |                      |                         | 5                       | 58                                | Chemical Data Reporting (CDR) Results (EPA) (2016) |             |                                     |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects                       | Minimum Conc. (Detects)                                                                                                                                                                                                                                                                                          | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                                            |                                                                                                                                                                                                                                                                                                                  |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 15                            | 1                 | Sites               | 6.67                                       | 0.025                                                                                                                                                                                                                                                                                                            | 0.0945                 | 0.15                      | 0.164                   | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                                            |                                                                                                                                                                                                                                                                                                                  |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 57                            | 11                | Sites               | 19                                         | 0.0047                                                                                                                                                                                                                                                                                                           | 0.0218                 | 0.248                     | 1.53                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 57                            | 11                | Sites               | 19                                         | 0.0047                                                                                                                                                                                                                                                                                                           | 0.0218                 | 0.248                     | 1.53                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 120                           | 1                 | Sites               | 0.83                                       | 0.086                                                                                                                                                                                                                                                                                                            | 0.086                  | 0.086                     | 0.086                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 113                           | 0                 | Sites               | 0                                          |                                                                                                                                                                                                                                                                                                                  |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 8                             | 1                 | Sites               | 12                                         | 0.086                                                                                                                                                                                                                                                                                                            | 0.086                  | 0.086                     | 0.086                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 3,008                         | 1,250             | Sites               | 42                                         | 8e-07                                                                                                                                                                                                                                                                                                            | 0.000202               | 0.0191                    | 2.6219                  | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                                            |                                                                                                                                                                                                                                                                                                                  |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                                            |                                                                                                                                                                                                                                                                                                                  |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                                            |                                                                                                                                                                                                                                                                                                                  |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>                               | <b>Notes</b>                                                                                                                                                                                                                                                                                                     |                        |                           |                         |             |       |
| Estimated Drinking Water Concentration (EDWC) in Surface Water, Chronic (cancer)       | 2020        | OPP                           | 46.3              | ug/L                | Pesticide in Water Calculator (PWC), v1.52 | The modeled surface water chronic, cancer concentration provided by the most recent available EPA OPP exposure assessment was selected as the occurrence concentration for oxadiazon. This value coincides with the critical effects of liver adenomas and carcinomas provided within the health effects report. |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.000000141                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.7926      | days                    |       |
| Boiling point                                                  | OPERA QSAR | 343.796     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 356.765     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000000128 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 8.81E-08    | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00000508  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00000867  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 1204.35     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 94.189      | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 7.72E-08    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 4.67306     | no units                |       |

**Oxadiazon**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                  |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 333              | USEPA. 2014. Oxadiazon. Human Health Assessment Scoping Document in Support of Registration Review. EPA-HQ-OPP-2014-0782-0004. DP No. D420616. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                       |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society. |



**Oxyfluorfen**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Oxyfluorfen                   |
| CASRN:          | 42874-03-3                    |
| DTXSID:         | <a href="#">DTXSID7024241</a> |
| Use:            | Pesticide; herbicide          |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.6                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 4       | carcinogen with linear MOA | 2          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                        | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.4                    | hepatocellular adenomas and carcinomas | general population | OPP               | 2019                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.2415                       | 90th Percentile                               | Finished Water                       | UCMR4  | 2018-2019 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Oxyfluorfen

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units          | Assessment Source | Critical Study              | Critical Effect                        | Target Population  | Exposure Factor (mL/kg- | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|----------------|-------------------|-----------------------------|----------------------------------------|--------------------|-------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.04   | mg/kg/day      | OPP 2019          | Goldenthal and Wazeter 1977 | multiple signs of liver toxicity       | general population | 33.8                    | 237        | [422]                    |       |
| Cancer Slope Factor (CSF)          | 0.0732 | (mg/kg/day)^-1 | OPP 2019          | Goldenthal & Wazeter 1977   | hepatocellular adenomas and carcinomas | general population | 33.8                    | 0.404      | [422]                    |       |
| Cancer Classification (CC)         | C      |                | OPP 2019          |                             |                                        |                    |                         |            | [422]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg- | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                         |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value    | Units          | Source                                  | Notes |
|---------------------------------------------|----------|----------------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |          |                |                                         |       |
| Cancer Slope Factor (CSF)                   | 0.0732   | (mg/kg/day)^-1 | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.2      | mg/L           | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.000437 | mg/L           | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.2      | mg/L           | Health-based screening levels from USGS |       |
| Health-Based Screening Level                | 0.000437 | mg/L           | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.03     | mg/kg/day      | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LOAEL                                            | 18.5      | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 183       | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 3.1       | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 36.4      | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 13.39     | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 51.400002 | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 585       | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 150.5     | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 18        | mg/kg/day | EPA Toxicity Reference Database | min   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0087498 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.253     | no units | TEST QSAR |       |
| Developmental toxin test | 0.864     | no units | TEST QSAR |       |

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EPA 815-R-21-006  
July 2021

EPA - Office of Water

Oxyfluorfen  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

July 2021

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 | 3,649                         | 6                 | Sites              | 0.16                 | 0.053                   | 0.0717                 | 0.242                     | 0.38                    | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 4,284                         | 24                | Sites              | 0.56                 | 0.001                   | 0.011                  | 0.045                     | 0.852                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 406                           | 22                | Sites              | 5.42                 | 0.001                   | 0.011                  | 0.0442                    | 0.605                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 3,878                         | 2                 | Sites              | 0.05                 | 0.002                   | 0.427                  | 0.682                     | 0.852                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 29               | 969,226                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 5                | 3,643                      | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 13                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 759                           | 28                | Sites               | 3.69                 | 0.001                   | 0.0447                 | 0.188                     | 4.27                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 1,453                         | 1                 | Sites               | 0.07                 | 0.008                   | 0.008                  | 0.008                     | 0.008                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 2,211                         | 29                | Sites               | 1.31                 | 0.001                   | 0.0426                 | 0.183                     | 4.27                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 8                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 6                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 1,939                         | 208               | Sites               | 11                   | 0.0038                  | 0.0995                 | 0.481                     | 9.23                    | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 6                 | Sites               | 16                   | 0.00147                 | 0.00482                | 0.0487                    | 0.0864                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                   |      | 0.00000013                              |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.54009     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 358.749     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 366.917     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.000000254 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.000000226 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000000308 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000000334 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 12909       | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 320.627     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.000000347 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 4.70955     | no units                |       |

**Oxyfluorfen**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 422              | USEPA. 2019. Oxyfluorfen: Draft Human Health Risk Assessment for Registration Review. EPA-HQ-OPP-2014-0778-0025. DP No. D445742. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                        |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**p,p'-DDE**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | p,p'-DDE                      |
| CASRN:          | 72-55-9                       |
| DTXSID:         | <a href="#">DTXSID9020374</a> |
| Use:            | Product of degradation of DDT |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 33                         |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 5       | carcinogen with linear MOA | 1          | 7         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                                                                                    | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.09                   | hepatocellular carcinomas, hepatomas; increased incidence of liver tumors including carcinomas in two strains of mice and in hamsters and of thyroid tumors in female rats by diet | general population | IRIS              | 1988                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date        |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-------------|
| 3                            | 90th Percentile                               | Finished Water                       | UCMR1  | 2001 - 2003 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | RD 2 | RD 3           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------------|
| Not Applicable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | X    | Not Applicable |
| Basis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                |
| DDE appears to occur infrequently at levels of concern in PWSs. DDE was detected in only one of the PWSs monitored under the UCMR 1 at a level greater than the MRL (0.8 ug/L) [a]. The MRL is greater than the HRL of 0.2 ug/L but represents a concentration that is within the 10-4 to the 10-6 cancer risk range targeted by EPA [b]. In addition, ambient water data from the USGS indicate that the maximum concentrations detected in surface and ground water were less than the HRL [c,d]. |      |                |
| [a] USEPA, 2008 [297]; [b] USEPA, 2000 [238]; [c] Martin, Crawford, & Larson, 2003 [134]; [d] Kolpin & Martin, 2003 [123]; as cited in USEPA, 2008 [296]                                                                                                                                                                                                                                                                                                                                            |      |                |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## p,p'-DDE

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units                     | Assessment Source | Critical Study                                   | Critical Effect                                                                                                                                                                         | Target Population  | Exposure Factor (mL/kg-) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                                                                      |
|------------------------------------|-------|---------------------------|-------------------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------------|------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 1     | mg/kg/day                 | PPRTV 2017        | Yamasaki et al., 2009                            | increased relative liver weight in adult male offspring exposed during gestation and via lactation                                                                                      | bottle-fed infants | 151                      | 1320       | [391]                    |                                                                                                                                            |
| Cancer Slope Factor (CSF)          | 0.34  | (mg/kg/day) <sup>-1</sup> | IRIS 1988         | Rossi et al. 1983; NCI 1978; Tomatis et al. 1974 | "hepatocellular carcinomas, hepatomas"; "increased incidence of liver tumors including carcinomas in two strains of mice and in hamsters and of thyroid tumors in female rats by diet." | general population | 33.8                     | 0.0870     | [200]                    | NOTE: the 2017 PPRTV assessment declines to derive a cancer slope factor for DDE because a carcinogenicity assessment is available on IRIS |
| Cancer Classification (CC)         | B2    |                           | IRIS 1988         |                                                  |                                                                                                                                                                                         |                    |                          |            | [200]                    | NOTE: the 2017 PPRTV assessment declines to derive a cancer slope factor for DDE because a carcinogenicity assessment is                   |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|--------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                          |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    | Metabolic, Systemic          | 0.834                        | Myrmet,2016         | 2016-09-01           | 2019-10-22         | 563                                            | 10                                              | 112                                            | 1                                                 |

## Other Health Data

| Data Element                                | Value         | Units                     | Source                            | Notes |
|---------------------------------------------|---------------|---------------------------|-----------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |               |                           |                                   |       |
| Cancer Slope Factor (CSF)                   | 0.34          | (mg/kg/day) <sup>-1</sup> | CalEPA OEHHA Chemical Database    |       |
| Chronic Health-Based Guidance Value         | 0.0001        | mg/L                      | MN DOH                            |       |
| Human Health Ambient Water Quality Criteria | 0.000000018   | mg/L                      | EPA Human Health Criteria for CWA |       |
| Inhalation Unit Risk (IUR)                  | 0.000097      | ug/m <sup>3</sup>         | CalEPA OEHHA Chemical Database    |       |
| Subchronic Provisional RfD                  | 0.0003        | mg/kg/day                 | EPA PPRTV                         |       |
| Cancer Classification (CC)                  | Female.Mice P | no units                  | HHS NTP                           |       |
| Cancer Classification (CC)                  | Female.Rats N | no units                  | HHS NTP                           |       |
| Cancer Classification (CC)                  | Male.Mice P   | no units                  | HHS NTP                           |       |
| Cancer Classification (CC)                  | Male.Rats N   | no units                  | HHS NTP                           |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                  | Notes |
|--------------------------------------------------|-------|-----------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                         |       |
| LD50                                             | 700   | mg/kg     | NIH HSDB                | min   |
| LD50                                             | 880   | mg/kg     | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 28.17 | percent   | EPA Chemistry Dashboard |       |
| TD50                                             | 119   | mg/kg/day | NIH CPDB                | max   |
| TD50                                             | 7.48  | mg/kg/day | NIH CPDB                | min   |

| Data Element             | Value    | Units    | Source    | Notes |
|--------------------------|----------|----------|-----------|-------|
| <b>Modeled Data</b>      |          |          |           |       |
| LD50                     | 0.001219 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | -0.248   | no units | TEST QSAR |       |
| Developmental toxin test | 0.419    | no units | TEST QSAR |       |

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 | 3,874                         | 1                 | Sites               | 0.03                 | 3                       | 3                      | 3                         | 3                       | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 8,246                         | 458               | Sites               | 5.55                 | 0                       | 0.002                  | 0.01                      | 0.062                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 1,836                         | 251               | Sites               | 14                   | 0                       | 0.003                  | 0.011                     | 0.062                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 6,411                         | 207               | Sites               | 3.23                 | 0                       | 0.001                  | 0.003                     | 0.008                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 47                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 13                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 294                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 464                           | 21                | Sites               | 4.53                 | 4.00E - 04              | 0.00466                | 0.0162                    | 0.068                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 886                           | 12                | Sites               | 1.35                 | 0.001                   | 0.003                  | 0.0446                    | 0.08                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 1,350                         | 33                | Sites               | 2.44                 | 4.00E - 04              | 0.0046                 | 0.0261                    | 0.08                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 8                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 6                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 600                           | 47                | Sites               | 7.83                 | 0.003                   | 0.01                   | 0.0428                    | 0.57                    | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 5                 | Sites               | 13                   | 0.000848                | 0.0032                 | 0.0159                    | 0.0238                  | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 9.84E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) | 1170                         | ng/g  |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 13.4608     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 338.523     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 360.317     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00000416  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.00000353  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000000159 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.000000262 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 12264.3     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 17298.2     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.0000268   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 6.45816     | no units                |       |

**p,p'-DDE**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                             |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                           |
| 123              | Kolpin, D.W. and J.D. Martin. 2003. Pesticides in Ground Water: Summary Statistics; Preliminary Results from Cycle I of the National Water Quality Assessment Program (NAWQA), 1992-2001. Available on the Internet at: <a href="http://ca.water.usgs.gov/pnsp/pestgw/Pest-GW_2001_Text.html">http://ca.water.usgs.gov/pnsp/pestgw/Pest-GW_2001_Text.html</a> .            |
| 134              | Martin, J.D., C.G. Crawford, and S.J. Larson. 2003. Pesticides in Streams: Summary Statistics; Preliminary Results from Cycle I of the National Water Quality Assessment Program (NAWQA), 1992-2001. Available on the Internet at: <a href="http://ca.water.usgs.gov/pnsp/pestsw/Pest-SW_2001_Text.html">http://ca.water.usgs.gov/pnsp/pestsw/Pest-SW_2001_Text.html</a> . |
| 200              | USEPA. 1988. p,p'-Dichlorodiphenyldichloroethylene (DDE); CASRN 72-55-9. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, DC.                                                                                                                                                    |
| 238              | USEPA. 2000. Unregulated Contaminant Monitoring Regulation Analytical Methods and Quality Control Manual. EPA 815-R-00-006.                                                                                                                                                                                                                                                |
| 296              | USEPA. 2008. Regulatory Determinations Support Document for Selected Contaminants from the Second Drinking Water Contaminant Candidate List (CCL 2). EPA Report 815-R-08-012. June 2008.                                                                                                                                                                                   |
| 297              | USEPA. 2008. The Analysis of Occurrence Data from the First Unregulated Contaminant Monitoring Regulation (UCMR 1) in Support of Regulatory Determinations for the Second Drinking Water Contaminant Candidate List. EPA 815-R-08-013. June.                                                                                                                               |
| 391              | USEPA. 2017. Provisional Peer-Reviewed Toxicity Values for p,p'-Dichlorodiphenyldichloroethylene (p,p'-DDE) (CASRN 72-55-9). EPA/690/R-17/007. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH.                                     |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                     |



**p-Cresol**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                                                       |
|-----------------|-------------------------------------------------------------------------------------------------------|
| Name:           | p-Cresol                                                                                              |
| CASRN:          | 106-44-5                                                                                              |
| DTXSID:         | <a href="#">DTXSID7021869</a>                                                                         |
| Use:            | Chemical intermediate making synthetic resins; in disinfectants and fumigants; as industrial solvent. |
| Chemical Notes: |                                                                                                       |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.0018                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 5       | reproductive and developmental effects | 9          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                 | Target Pop.               | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------------------------------|---------------------------|-------------------|----------------------|
| HRL                                                      | 100                    | neurotoxicity and mortality in pregnant rabbits | women of childbearing age | PPRTV             | 2010                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.181                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## p-Cresol

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                                 | Target Population         | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------|-------|-----------|-------------------|----------------|-------------------------------------------------|---------------------------|-----------------------------|------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.02  | mg/kg/day | PPRTV 2010        | BRRC (1988a)   | neurotoxicity and mortality in pregnant rabbits | women of childbearing age | 35.4                        | 113        | [315]                    | NOTE: Though the critical effects in this study are not reproductive or developmental effects, they were observed in a study of pregnant rabbits. The assessment notes that no chronic studies were available to calculate a chronic duration RfD. Given the data gaps in non-pregnant adult animals, we make the conservative assumption that the effects observed in the 2-gen study are pregnancy related. For this reason we use the exposure factors for women of |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     | 2009-09-01           | 2019-12-17         | 433                                            | 0                                               | 9                                              |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source    | Notes |
|---------------------------------------------|-------|-----------|-----------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |           |       |
| Chronic Health-Based Guidance Value         | 0.003 | mg/L      | MN DOH    |       |
| Subchronic Provisional RfD                  | 0.02  | mg/kg/day | EPA PPRTV |       |

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 1800  | mg/kg   | NIH HSDB                | max   |
| LD50                                             | 207   | mg/kg   | NIH HSDB                | min   |
| Percent of active toxcast in vitro assays tested | 1.59  | percent | EPA Chemistry Dashboard |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0048306 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.06      | no units | TEST QSAR |       |
| Developmental toxin test | 0.214     | no units | TEST QSAR |       |

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OCCURRENCE DATA

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## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                                |             | Prevalence                          |                      |                       |                         | Magnitude                  |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                                |             | Prevalence                          |                      |                       |                         | Magnitude                  |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 566                                 | 45                   | Sites                 | 7.95                    | 0.01                       | 0.03                      | 0.181                        | 73                         | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 88                                  | 37                   | Sites                 | 42                      | 0.01                       | 0.04                      | 0.177                        | 73                         | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 478                                 | 8                    | Sites                 | 1.67                    | 0.01                       | 0.02                      | 0.078                        | 0.19                       | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) | 8                   | 421,441                       | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) | 50M - 100M                   |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             | Prevalence                          |                      |                        |                         | Magnitude                  |                           |                              |                            |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                                  | NA                   | Sites                  | 0                       |                            |                           |                              |                            | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             | Prevalence                          |                      |                        |                         | Magnitude                  |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 722                                 | 305                  | Sites                  | 42                      | 0.01                       | 0.03                      | 0.186                        | 91.1                       | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 771                                 | 52                   | Sites                  | 6.74                    | 0.01                       | 0.05                      | 0.47                         | 11.6                       | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,493                               | 357                  | Sites                  | 24                      | 0.01                       | 0.03                      | 0.19                         | 91.1                       | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                                  | NA                   | Sites                  | 0                       |                            |                           |                              |                            | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                                  | 21                   | Sites                  | 55                      | 0.0086                     | 0.0219                    | 0.0391                       | 0.135                      | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                                   | 2                    | Sites                  | 100                     |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             | Prevalence                          |                      |                        |                         | Magnitude                  |                           |                              |                            |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                                  | 13                   | Sites                  | 62                      | 0.046                      | 0.3                       | 1.1                          | 1.2                        | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expcast exposure                                   |      | 0.00000396                                    |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 5.33885     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 200.232     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 185.666     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.0992564   | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.21677     | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.168658    | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.141579    | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 15.2284     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 9.39723     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.000000807 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 1.94663     | no units                |       |

**p-Cresol**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                    |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                  |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922).           |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                  |
| 315              | USEPA. 2010. Provisional Peer-Reviewed Toxicity Values for 4-Methylphenol (p-Cresol) (CASRN 106-44-5). EPA/690/R-10/019F. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH. |

**Pendimethalin**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                        |                                                                            |
|------------------------|----------------------------------------------------------------------------|
| <b>Name:</b>           | Pendimethalin                                                              |
| <b>CASRN:</b>          | 40487-42-1                                                                 |
| <b>DTXSID:</b>         | <a href="#">DTXSID7024245</a>                                              |
| <b>Use:</b>            | Selective herbicide for control of broadleaf weeds and grassy weed species |
| <b>Chemical Notes:</b> |                                                                            |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                                 |                                   |
|---------------------------------|-----------------------------------|
| <b>Draft CCL5 List Decision</b> | <b>Final Hazard Quotient (HQ)</b> |
| Not List                        | 0.000044                          |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 4       | reproductive and developmental effects | 9          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                       | Target Pop.               | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------------------------------------|---------------------------|-------------------|----------------------|
| HRL                                                      | 2000                   | hormonal and histopathological changes in the thyroid | women of childbearing age | OPP               | 2019                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.088                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                          |
|--------------------------|
| <b>Public Nomination</b> |
|                          |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Pendimethalin

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study                                   | Critical Effect                                       | Target Population         | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|--------------------------------------------------|-------------------------------------------------------|---------------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.3   | mg/kg/day | OPP 2019          | Fischer 1991 and 1993; Devito and Braverman 1993 | hormonal and histopathological changes in the thyroid | women of childbearing age | 35.4                        | 1690       | [423]                    |       |
| Cancer Classification (CC)         | C     |           | OPP 2019          |                                                  |                                                       |                           |                             |            | [423]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 7     | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 1     | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 2     | mg/L      | EPA HHBP                                |       |
| Drinking Water Guideline Value              | 0.02  | mg/L      | WHO Drinking Water Quality Guidelines   |       |
| Health-Based Screening Level                | 2     | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.3   | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 1050      | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 5000      | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 51        | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 622.09998 | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 46        | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 78.3      | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 15.43     | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 250       | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 25        | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0067453 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.117     | no units | TEST QSAR |       |
| Developmental toxin test | 0.948     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Pendimethalin  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

July 2021

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             |                               | Prevalence        |                    |                      |                         |                        | Magnitude                 |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             |                               | Prevalence        |                    |                      |                         |                        | Magnitude                 |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 11,234                        | 412               | Sites              | 3.67                 | 2.00E - 04              | 0.019                  | 0.088                     | 42                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,224                         | 387               | Sites              | 17                   | 2.00E - 04              | 0.019                  | 0.0871                    | 42                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9,010                         | 25                | Sites              | 0.28                 | 7.00E - 04              | 0.0185                 | 0.107                     | 0.824                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 48               | 17,968,965                | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 11               | 5,858                      | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               | Prevalence        |                     |                      |                         |                        | Magnitude                 |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 15                            | 2                 | Sites               | 13                   | 0.007492                | 0.008                  | 0.0664                    | 0.076                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               | Prevalence        |                     |                      |                         |                        | Magnitude                 |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 1,006                         | 109               | Sites               | 11                   | 0.001                   | 0.024                  | 0.118                     | 2.46                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 3,066                         | 2                 | Sites               | 0.07                 | 0.011                   | 0.0175                 | 0.0384                    | 0.048                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 4,071                         | 111               | Sites               | 2.73                 | 0.001                   | 0.024                  | 0.115                     | 2.46                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 225                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 218                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 8                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 4,405                         | 416               | Sites               | 9.44                 | 0.005                   | 0.191                  | 1.28                      | 8.35                    | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 13                | Sites               | 34                   | 0.000319                | 0.0039                 | 0.0301                    | 0.578                   | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 4                 | Sites               | 0.58                 | 7e-04                   | 0.00145                | 0.00437                   | 0.0056                  | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               | Prevalence        |                     |                      |                         |                        | Magnitude                 |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 1.66E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.53725     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 330.972     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 363.278     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.0000268   | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000000621 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00000164  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00000984  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 979.509     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 59.5662     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.00000168  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 5.0582      | no units                |       |

**Pendimethalin**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 423              | USEPA. 2019. Pendimethalin - Human Health Risk Assessment to Support the Proposed New Uses on Leaf Petiole Vegetable Subgroup 22B, Monarda and Rosemary. EPA-HQ-OPP-2018-0619-0008. DP No. D448588. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                     |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |



**Permethrin**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Permethrin                    |
| CASRN:          | 52645-53-1                    |
| DTXSID:         | <a href="#">DTXSID8022292</a> |
| Use:            | Insecticide                   |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 | X |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.052                      |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 4       | carcinogen with linear MOA | 4          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 3                      | lung adenomas and/or carcinomas in female mice | general population | OPP               | 2017                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.1558                       | 90th Percentile                               | Finished Water                       | UCMR4  | 2018-2019 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

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CCL 5 Contaminant Information Sheet  
HEALTH EFFECTS DATA

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## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value    | Units          | Assessment Source | Critical Study              | Critical Effect                                | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|----------|----------------|-------------------|-----------------------------|------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.147    | mg/kg/day      | OPP 2017          | Wolansky et al., 2006       | reduced motor activity                         | bottle-fed infants | 151                         | 195        | [388]                    |       |
| Cancer Slope Factor (CSF)          | 0.009567 | (mg/kg/day)^-1 | OPP 2017          | Ellison, 1979; Barton, 2000 | lung adenomas and/or carcinomas in female mice | general population | 33.8                        | 3.09       | [388]                    |       |
| Cancer Classification (CC)         | L        |                | OPP 2017          |                             |                                                |                    |                             |            | [388]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value    | Units          | Source                                  | Notes |
|---------------------------------------------|----------|----------------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |          |                |                                         |       |
| Acute Human Health Benchmark                | 1.7      | mg/L           | EPA HHBP                                |       |
| Acute Minimal Risk Level (MRL)              | 0.3      | mg/kg/day      | CDC ATSDR                               |       |
| Acute PAD                                   | 0.25     | mg/kg/day      | EPA HHBP                                |       |
| Cancer Classification (CC)                  | 3        | no units       | WHO IARC                                |       |
| Cancer Slope Factor (CSF)                   | 0.009567 | (mg/kg/day)^-1 | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 1.6      | mg/L           | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.003344 | mg/L           | EPA HHBP                                |       |
| Health-Based Screening Level                | 1.6      | mg/L           | Health-based screening levels from USGS |       |
| Health-Based Screening Level                | 0.003344 | mg/L           | Health-based screening levels from USGS |       |
| Intermediate Minimal Risk Level (MRL)       | 0.2      | mg/kg/day      | CDC ATSDR                               |       |
| Population-Adjusted Dose (PAD)              | 0.25     | mg/kg/day      | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 250   | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 6000  | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 1200  | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 91.5  | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 5     | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 600   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 8.43  | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0018578 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.272     | no units | TEST QSAR |       |
| Developmental toxin test | 0.816     | no units | TEST QSAR |       |

## Permethrin

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 | 3,649                               | 10                   | Sites                 | 0.27                    | 0.04                       | 0.054                     | 0.156                        | 0.212                      | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 14                                  | 2                    | Sites                 | 14                      | 0.0077                     | 0.00885                   | 0.00954                      | 0.01                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 14                                  | 2                    | Sites                 | 14                      | 0.0077                     | 0.00885                   | 0.00954                      | 0.01                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 45               | 604,727                      | 2016 | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) | 9                   | 20,106                        | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 3                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 9                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 140                                 | 5                    | Sites                  | 3.57                    | 0.0044                     | 0.0053                    | 0.0108                       | 0.0146                     | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 3                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 143                                 | 5                    | Sites                  | 3.5                     | 0.0044                     | 0.0053                    | 0.0108                       | 0.0146                     | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 6,049                               | 452                  | Sites                  | 7.47                    | 0.000608                   | 0.0169                    | 0.113                        | 180.9                      | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expcast exposure                                   |      | 0.000002                                      |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.34923     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 401.477     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 412.391     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 3.02E-08    | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.00000001  | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000000627 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 5.13E-08    | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 469.919     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 727.78      | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 4.13E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 6.4075      | no units                |       |

**Permethrin**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                  |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 388              | USEPA. 2017. Permethrin: Human Health Draft Risk Assessment for Registration Review. EPA-HQ-OPP-2011-0039-0088. DP No. 414137. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                       |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society. |

## Phenanthrene

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                                                                                     |
|-----------------|-----------------------------------------------------------------------------------------------------|
| Name:           | Phenanthrene                                                                                        |
| CASRN:          | 85-01-8                                                                                             |
| DTXSID:         | <a href="#">DTXSID6024254</a>                                                                       |
| Use:            | Dyestuffs, explosives, synthesis of drugs, biochemical research, manufacturing phenanthrenequinone. |
| Chemical Notes: |                                                                                                     |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             |   |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 |                            |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity | Prevalence | Magnitude |
|---------|----------|------------|-----------|
|         |          | 9          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect | Target Pop. | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------|-------------|-------------------|----------------------|
|                                                          |                        |                 |             |                   |                      |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.048                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

|                   |
|-------------------|
| Public Nomination |
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Phenanthrene

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element               | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|----------------------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
| Cancer Classification (CC) | D     |       | IRIS 1990         |                |                 |                   |                             |            | [208]                    |       |
| Cancer Classification (CC) | D     |       | OW 1991           |                |                 |                   |                             |            | [212]                    |       |
| Cancer Classification (CC) | I     |       | PPRTV 2009        |                |                 |                   |                             |            | [303]                    |       |
|                            |       |       | ATSDR 1995        |                |                 |                   |                             |            | [10]                     |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     | 2008-03-08           | 2020-03-16         | 2319                                           | 0                                               | 16                                             |                                                   |

## Other Health Data

| Data Element                                | Value | Units    | Source   | Notes |
|---------------------------------------------|-------|----------|----------|-------|
| <b>Measured Data and Assessment Results</b> |       |          |          |       |
| Cancer Classification (CC)                  | 3     | no units | WHO IARC |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 700   | mg/kg   | NIH HSDB                |       |
| Percent of active toxcast in vitro assays tested | 5.92  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0089331 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.629     | no units | TEST QSAR |       |
| Developmental toxin test | 0.651     | no units | TEST QSAR |       |

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Phenanthrene

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OCCURRENCE DATA

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                                |             | Prevalence                          |                      |                       |                         | Magnitude                  |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                                |             | Prevalence                          |                      |                       |                         | Magnitude                  |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 593                                 | 39                   | Sites                 | 6.58                    | 0.003                      | 0.014                     | 0.048                        | 0.13                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 101                                 | 29                   | Sites                 | 29                      | 0.003                      | 0.0145                    | 0.05                         | 0.13                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 492                                 | 10                   | Sites                 | 2.03                    | 0.008                      | 0.013                     | 0.017                        | 0.044                      | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) | 27                  | 287,091                       | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) | 500K - 1M                    |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             | Prevalence                          |                      |                        |                         | Magnitude                  |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 28                                  | 1                    | Sites                  | 3.57                    | 0.001                      | 0.002                     | 0.002                        | 0.002                      | ug/L        |       |
| Drinking Water Monitoring Data - WA (Finished)                | 2006 - 2011 | 481                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                                  | NA                   | Sites                  | 0                       |                            |                           |                              |                            | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             | Prevalence                          |                      |                        |                         | Magnitude                  |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 233                                 | 2                    | Sites                  | 0.86                    | 0.1                        | 0.3                       | 0.356                        | 0.37                       | ug/L        |       |
| Drinking Water Monitoring Data - WA (Source)                  | 2006 - 2011 | 634                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 866                                 | 258                  | Sites                  | 30                      | 0.003                      | 0.02                      | 0.255                        | 26.3                       | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 1,099                               | 98                   | Sites                  | 8.92                    | 0.002                      | 0.017                     | 0.0818                       | 140                        | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,965                               | 356                  | Sites                  | 18                      | 0.002                      | 0.02                      | 0.24                         | 140                        | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                                  | NA                   | Sites                  | 0                       |                            |                           |                              |                            | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                                  | 6                    | Sites                  | 16                      | 0.0074                     | 0.0176                    | 0.0239                       | 0.0241                     | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             | Prevalence                          |                      |                        |                         | Magnitude                  |                           |                              |                            |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                                  | 2                    | Sites                  | 9.52                    | 0.0086                     | 0.0087                    | 0.00878                      | 0.0088                     | ug/L        |       |
| Estimated Concentration in Water                              | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg-<br>bw/day) | Notes |
|----------------------------------------------------|------|------------------------------------------------|-------|
| ExpoCast exposure                                  |      | 0.00000121                                     |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHanes biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHanes biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHanes biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|-------------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 63.7756    | days                    |       |
| Boiling point                                                     | OPERA QSAR | 340.536    | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 340.522    | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.0000303  | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.000049   | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.00000116 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.00000355 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 2227.32    | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 633.87     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.0000518  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 4.52256    | no units                |       |

**Phenanthrene**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                          |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10               | ATSDR. 1995. Toxicological Profile for Polycyclic Aromatic Hydrocarbons. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                    |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.        |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922). |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                      |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.        |
| 208              | USEPA. 1990. Chemical Assessment Summary, Phenanthrene. U.S. Environmental Protection Agency, National Center for Environmental Protection, Integrated Risk Information System (IRIS), Washington, D.C.                                                                                                 |
| 212              | USEPA. 1991. Drinking Water Criteria Document for Polycyclic Aromatic Hydrocarbons (PAHs). U.S. Environmental Protection Agency, Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH.                                                           |
| 303              | USEPA. 2009. Provisional Peer-Reviewed Toxicity Values for Phenanthrene. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH.                                        |



**Phenol**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                  |
|-----------------|----------------------------------|
| Name:           | Phenol                           |
| CASRN:          | 108-95-2                         |
| DTXSID:         | <a href="#">DTXSID5021124</a>    |
| Use:            | Pesticide; chemical intermediate |
| Chemical Notes: |                                  |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxics                                 | X |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.00029                    |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 3       | reproductive and developmental effects | 10         | 6         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                 | Target Pop.               | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------------------------------|---------------------------|-------------------|----------------------|
| HRL                                                      | 3000                   | reductions in mean fetal body weight per litter | women of childbearing age | OPP               | 2019                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.864                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

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Phenol

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HEALTH EFFECTS DATA

Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study              | Critical Effect                                 | Target Population         | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|-----------------------------|-------------------------------------------------|---------------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.6   | mg/kg/day | OPP 2019          | Jones-Price and Ledoux 1983 | reductions in mean fetal body weight per litter | women of childbearing age | 35.4                        | 3390       | [426]                    |       |
| Cancer Classification (CC)         | I     |           | OPP 2019          |                             |                                                 |                           |                             |            | [426]                    |       |

Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

Other Health Data

| Data Element                                | Value         | Units     | Source                            | Notes |
|---------------------------------------------|---------------|-----------|-----------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |               |           |                                   |       |
| 10-day Health Advisory                      | 6             | mg/L      | EPA DWSHA 2018                    |       |
| Acute Minimal Risk Level (MRL)              | 1             | mg/kg/day | CDC ATSDR                         |       |
| Cancer Classification (CC)                  | 3             | no units  | WHO IARC                          |       |
| Chronic Health-Based Guidance Value         | 4             | mg/L      | MN DOH                            |       |
| Human Health Ambient Water Quality Criteria | 4             | mg/L      | EPA Human Health Criteria for CWA |       |
| Lifetime Health Advisory                    | 2             | mg/L      | EPA DWSHA 2018                    |       |
| Reference Concentration (RfC)               | 200           | ug/m^3    | CalEPA OEHHA Chemical Database    |       |
| Cancer Classification (CC)                  | Female.Mice N | no units  | HHS NTP                           |       |
| Cancer Classification (CC)                  | Female.Rats N | no units  | HHS NTP                           |       |
| Cancer Classification (CC)                  | Male.Mice N   | no units  | HHS NTP                           |       |
| Cancer Classification (CC)                  | Male.Rats N   | no units  | HHS NTP                           |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                  | Notes |
|--------------------------------------------------|-------|-----------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                         |       |
| LD50                                             | 100   | mg/kg     | NIH HSDB                | min   |
| LD50                                             | 530   | mg/kg     | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 0.44  | percent   | EPA Chemistry Dashboard |       |
| TD50                                             | 133   | mg/kg/day | NIH CPDB                | min   |
| TD50                                             | 18500 | mg/kg/day | NIH CPDB                | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0046132 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.246     | no units | TEST QSAR |       |
| Developmental toxin test | 0.58      | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Phenol  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

July 2021

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 462                           | 98                | Sites               | 21                   | 0.08                    | 0.34                   | 0.864                     | 12                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 93                            | 43                | Sites               | 46                   | 0.09                    | 0.29                   | 0.652                     | 12                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 369                           | 55                | Sites               | 15                   | 0.08                    | 0.41                   | 1.16                      | 2.5                     | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) | 44               | 5,965,893                  | Chemical Data Reporting (CDR) Results (EPA) (2016) | 1B - 5B                      |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 7                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 34                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 833                           | 183               | Sites               | 22                   | 0.02                    | 0.14                   | 0.888                     | 54.3                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 1,018                         | 85                | Sites               | 8.35                 | 0.03                    | 0.15                   | 1.06                      | 35.7                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,851                         | 268               | Sites               | 14                   | 0.02                    | 0.14                   | 1.04                      | 54.3                    | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                            | 4                 | Sites               | 11                   | 0.0548                  | 0.0674                 | 0.13                      | 0.151                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                             | 2                 | Sites               | 100                  | 0.1                     | 0.45                   | 0.73                      | 0.8                     | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                            | 11                | Sites               | 52                   | 1                       | 1.6                    | 3.55                      | 5.4                     | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 0.0000876                               |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.58026     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 187.496     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 176.783     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.256635    | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.151356    | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.647838    | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.294442    | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 16.2785     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 7.60326     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000000495 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 1.57532     | no units                |       |

**Phenol**

CCL 5 Contaminant Information Sheet

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                   |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802. |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                               |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79. |
| 426              | USEPA. 2019. Registration Review Draft Risk Assessment for Phenol and Salts. EPA-HQ-OPP-2012-0810-0007. DP No. 453361. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                |

**Phenol, 4-(1,1,3,3-tetramethylbutyl)-**  
CCL 5 Contaminant Information Sheet

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July 2021

**CONTAMINANT IDENTIFYING INFORMATION**

|                        |                                                                                                                                                                          |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Name:</b>           | Phenol, 4-(1,1,3,3-tetramethylbutyl)-                                                                                                                                    |
| <b>CASRN:</b>          | 140-66-9                                                                                                                                                                 |
| <b>DTXSID:</b>         | <a href="#">DTXSID9022360</a>                                                                                                                                            |
| <b>Use:</b>            | Used in nonionic surfactants, plasticizers, antioxidants, fuel oil stabilizer, intermediate for resins, fungicides, bactericides, dyestuffs, adhesives, rubber chemicals |
| <b>Chemical Notes:</b> |                                                                                                                                                                          |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                                 |                                   |
|---------------------------------|-----------------------------------|
| <b>Draft CCL5 List Decision</b> | <b>Final Hazard Quotient (HQ)</b> |
| Not List                        | 0.0014                            |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 5       | reproductive and developmental effects | 9          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                          | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 70                     | decreased uterine weight, decreased pup body weight, increased time to preputial separation, decreased adult body weight | bottle-fed infants | MDH               | 2015                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.099                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                          |
|--------------------------|
| <b>Public Nomination</b> |
|                          |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

Phenol, 4-(1,1,3,3-tetramethylbutyl)-  
CCL 5 Contaminant Information Sheet

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element                       | Value | Units     | Assessment Source | Critical Study  | Critical Effect                                                                                                          | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.051 | mg/kg/day | MDH 2015          | Tyl et al. 1999 | decreased uterine weight, decreased pup body weight, increased time to preputial separation, decreased adult body weight | bottle-fed infants | 151                         | 67.6                       | [137]                    |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Reproductive                | 0.0000275                   | Blake, 2004        | Systemic                     | 450                          | Bian, 2006          |                      | 2020-04-07         | 538                                            | 17                                              | 6                                              | 12                                                |

**Other Health Data**

| Data Element                                      | Value | Units | Source | Notes |
|---------------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b>       |       |       |        |       |
| Acute Health-Based Guidance Value                 | 0.1   | mg/L  | MN DOH |       |
| Chronic Health-Based Guidance Value               | 0.1   | mg/L  | MN DOH |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.1   | mg/L  | MN DOH |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 2000  | mg/kg   | NIH HSDB                | min   |
| LD50                                             | 3210  | mg/kg   | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 40.93 | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0070146 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.049     | no units | TEST QSAR |       |
| Developmental toxin test | 0.75      | no units | TEST QSAR |       |

Phenol, 4-(1,1,3,3-tetramethylbutyl)-  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

July 2021

## Scoring Data

| Nationally Representative Water Data                           | Date                    | Number of<br>PWS/ Sites/<br>Samples  | Number of<br>Detects | PWS/ Sites/<br>Samples                                | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects)   | 90th Percentile<br>(Detects)          | Maximum Conc.<br>(Detects)                            | Conc. Units | Notes                               |
|----------------------------------------------------------------|-------------------------|--------------------------------------|----------------------|-------------------------------------------------------|-------------------------|----------------------------|-----------------------------|---------------------------------------|-------------------------------------------------------|-------------|-------------------------------------|
| <b>Finished Water</b>                                          |                         |                                      |                      |                                                       |                         |                            |                             |                                       |                                                       |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019             |                                      |                      |                                                       |                         |                            |                             |                                       |                                                       |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015             |                                      |                      |                                                       |                         |                            |                             |                                       |                                                       |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010             |                                      |                      |                                                       |                         |                            |                             |                                       |                                                       |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003             |                                      |                      |                                                       |                         |                            |                             |                                       |                                                       |             |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997             |                                      |                      |                                                       |                         |                            |                             |                                       |                                                       |             |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992             |                                      |                      |                                                       |                         |                            |                             |                                       |                                                       |             |                                     |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986             |                                      |                      |                                                       |                         |                            |                             |                                       |                                                       |             |                                     |
| <b>Ambient Water</b>                                           |                         |                                      |                      |                                                       |                         |                            |                             |                                       |                                                       |             |                                     |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017             | 567                                  | 38                   | Sites                                                 | 6.7                     | 0.01                       | 0.04                        | 0.099                                 | 0.59                                                  | ug/L        |                                     |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017             | 88                                   | 22                   | Sites                                                 | 25                      | 0.01                       | 0.02                        | 0.12                                  | 0.19                                                  | ug/L        |                                     |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017             | 479                                  | 16                   | Sites                                                 | 3.34                    | 0.02                       | 0.05                        | 0.09                                  | 0.59                                                  | ug/L        |                                     |
| <b>Pesticide Application Data</b>                              | <b>Number of States</b> | <b>Amount Applied<br/>(lbs/year)</b> | <b>Date</b>          | <b>Toxic Release Data</b>                             |                         |                            | <b>Number of<br/>States</b> | <b>Amount Released<br/>(lbs/year)</b> | <b>Chemical Production Data</b>                       |             | <b>Production Volume (lbs/year)</b> |
| Estimated Annual Agricultural Pesticide Use (USGS)             |                         |                                      |                      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                         |                            |                             |                                       | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |             | 50M - 100M                          |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 717                                 | 61                   | Sites                  | 8.51                    | 0.01                       | 0.1                       | 0.1                          | 1                          | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 689                                 | 29                   | Sites                  | 4.21                    | 0.01                       | 0.25                      | 1.32                         | 42.6                       | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,406                               | 90                   | Sites                  | 6.4                     | 0.01                       | 0.1                       | 0.2                          | 42.6                       | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                                  | 8                    | Sites                  | 21                      | 0.0204                     | 0.0374                    | 0.286                        | 0.355                      | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                                  | 14                   | Sites                  | 67                      | 0.1                        | 0.19                      | 0.223                        | 0.23                       | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                       | <b>Value</b>         | <b>Units</b>           | <b>Model</b>            | <b>Notes</b>               |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expocast exposure                                  |      | 0.0000755                                     |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) | 0.2                             | ug/l  |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 4.08153     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 263.357     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 293.064     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.00142088  | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.00156315  | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000088    | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000132434 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 344.461     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 139.637     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.00000786  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 4.86646     | no units                |       |

**Phenol, 4-(1,1,3,3-tetramethylbutyl)-**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                   |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802. |
| 137              | MDH. 2015. Toxicological Summary for: 4-tert-Octylphenol. Minnesota Department of Health (MDH), Environmental Health Division, Health Risk Assessment Unit, St Paul, MN.                                                                                                                         |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                               |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79. |



**Phorate**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                      |
|-----------------|----------------------------------------------------------------------|
| Name:           | Phorate                                                              |
| CASRN:          | 298-02-2                                                             |
| DTXSID:         | <a href="#">DTXSID4032459</a>                                        |
| Use:            | Insecticide used on corn, sugar beets, cotton, brassicas, and coffee |
| Chemical Notes: |                                                                      |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxics                                 | X |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.42                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 7       | reproductive and developmental effects | 3          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                    | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.2                    | red blood cell and brain cholinesterase inhibition | bottle-fed infants | OPP               | 2006                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0848                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Phorate

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value   | Units     | Assessment Source | Critical Study                  | Critical Effect                                    | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                                                                                          |
|------------------------------------|---------|-----------|-------------------|---------------------------------|----------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.00017 | mg/kg/day | OPP 2006          | Shellenberger and Tegeris, 1987 | red blood cell and brain cholinesterase inhibition | bottle-fed infants | 151                         | 0.225      | [273]                    | NOTE: this compound is a organophosphate pesticide. EPA has created a cumulative risk assessment regarding the common mechanisms of organophosphate compounds. |
| Cancer Classification (CC)         | E       |           | OPP 2006          |                                 |                                                    |                    |                             |            | [273]                    | NOTE: this compound is a organophosphate pesticide. EPA has created a cumulative risk assessment regarding the common mechanisms of organophosphate compounds. |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value   | Units     | Source                                  | Notes |
|---------------------------------------------|---------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |         |           |                                         |       |
| Acute Human Health Benchmark                | 0.005   | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.0008  | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.0011  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.0011  | mg/L      | Health-based screening levels from USGS |       |
| Maximum Allowable Concentration (MAC)       | 0.002   | mg/L      | Canadian Drinking Water Guidelines      |       |
| Population-Adjusted Dose (PAD)              | 0.00017 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units     | Source                          | Notes |
|---------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                 |       |
| LD50                                        | 1.1   | mg/kg     | NIH HSDB                        | min   |
| LD50                                        | 3.7   | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                       | 0.8   | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                       | 0.05  | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                       | 0.01  | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                       | 0.4   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in                | 5.26  | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value    | Units    | Source    | Notes |
|--------------------------|----------|----------|-----------|-------|
| <b>Modeled Data</b>      |          |          |           |       |
| LD50                     | 7.83E-06 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | -0.017   | no units | TEST QSAR |       |
| Developmental toxin test | -0.176   | no units | TEST QSAR |       |

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OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 11,241                        | 24                | Sites               | 0.21                 | 0.002                   | 0.012                  | 0.0848                    | 0.6                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,230                         | 21                | Sites               | 0.94                 | 0.002                   | 0.0125                 | 0.082                     | 0.6                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9,012                         | 3                 | Sites               | 0.03                 | 0.00317                 | 0.006                  | 0.147                     | 0.208                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 19               | 945,534                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 1                 | Sites               | 5.88                 | 0.078                   | 0.078                  | 0.078                     | 0.078                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 4                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 1                 | Sites               | 0.44                 | 0.062                   | 0.062                  | 0.062                     | 0.062                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 1                 | Sites               | 8.33                 | 0.062                   | 0.062                  | 0.062                     | 0.062                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 11,178                        | 13                | Sites               | 0.12                 | 0.016                   | 0.075                  | 0.129                     | 0.22                    | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 1                 | Sites               | 0.14                 | 0.0032                  | 0.0032                 | 0.0032                    | 0.0032                  | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 1.23E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 139.463     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 285.229     | degree C                |       |
| Boiling point                                                  | TEST QSAR  |             |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000319476 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000179473 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000199114 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.000233346 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 71.5592     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 55.5904     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.00000156  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.43867     | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 273              | USEPA. 2006. Reregistration Eligibility Decision for Phorate. EPA-HQ-OPP-2008-0174-0003. U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Washington, D.C.                                                                                                                                                                                                                             |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                    |

**Phosmet**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Phosmet                       |
| CASRN:          | 732-11-6                      |
| DTXSID:         | <a href="#">DTXSID5024261</a> |
| Use:            |                               |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.23                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 7       | reproductive and developmental effects | 2          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                    | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.2                    | pup red blood cell acetylcholinesterase inhibition | bottle-fed infants | OPP               | 2016                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.045                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Phosmet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value   | Units     | Assessment Source | Critical Study | Critical Effect                                    | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|---------|-----------|-------------------|----------------|----------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.00016 | mg/kg/day | OPP 2016          | Barnett 2009   | pup red blood cell acetylcholinesterase inhibition | bottle-fed infants | 151                         | 0.212      | [371]                    |       |
| Cancer Classification (CC)         | S       |           | OPP 2016          |                |                                                    |                    |                             |            | [371]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value  | Units     | Source                                  | Notes |
|---------------------------------------------|--------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |        |           |                                         |       |
| Acute Human Health Benchmark                | 0.08   | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.012  | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.003  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.003  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.0006 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 160   | mg/kg   | NIH HSDB                | max   |
| LD50                                             | 26    | mg/kg   | NIH HSDB                | min   |
| Percent of active toxcast in vitro assays tested | 6.25  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0001349 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.722     | no units | TEST QSAR |       |
| Developmental toxin test | 0.568     | no units | TEST QSAR |       |

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Draft Fifth Contaminant Candidate List (CCL 5)  
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Phosmet  
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OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 3,376                         | 4                 | Sites              | 0.12                 | 0.006                   | 0.0125                 | 0.045                     | 0.063                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 380                           | 3                 | Sites              | 0.79                 | 0.006                   | 0.018                  | 0.0495                    | 0.063                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 2,996                         | 1                 | Sites              | 0.03                 | 0.007                   | 0.007                  | 0.007                     | 0.007                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 40               | 844,617                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 15                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 569                           | 2                 | Sites               | 0.35                 | 0.017                   | 0.0945                 | 0.141                     | 0.172                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 1,971                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 2,539                         | 2                 | Sites               | 0.08                 | 0.017                   | 0.0945                 | 0.141                     | 0.172                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 119                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 111                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 8                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 9,749                         | 7                 | Sites               | 0.07                 | 0.0535                  | 0.375                  | 0.978                     | 1.5                     | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 106                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Southeast Stream Quality Assessment (SESQA) (Ambient) [102]                            | 2014        | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 9.34E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 125.261     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 403.932     | degree C                |       |
| Boiling point                                                  | TEST QSAR  |             |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000000516 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000000668 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0000549   | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0000598   | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 2.48955     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 9.18333     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 3.84E-10    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.89029     | no units                |       |

**Phosmet**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 102              | <a href="https://webapps.usgs.gov/rsqa/#!/region/SESQA">https://webapps.usgs.gov/rsqa/#!/region/SESQA</a>                                                                                                                                                                                                                                                                                                                          |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 371              | USEPA. 2016. Phosmet. Draft Human Health Risk Assessment to Support Registration Review. EPA-HQ-OPP-2009-0316-0022. DP No. D420736. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                     |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                    |



**Phosphorus**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                        |
|-----------------|--------------------------------------------------------|
| Name:           | Phosphorus                                             |
| CASRN:          | 7723-14-0                                              |
| DTXSID:         | <a href="#">DTXSID1024382</a>                          |
| Use:            | Former pesticide; chemical intermediate; as ammunition |
| Chemical Notes: |                                                        |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 | X |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.0013                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
|         | no adverse effects | 10         | 10        |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect    | Target Pop.    | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------|----------------|-------------------|----------------------|
| SL                                                       | 300000                 | no adverse effects | pregnant women | IOM               | 1997                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 381                          | 90th Percentile                               | Finished Water                       | NIRS   | 1984-1986 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Phosphorus

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value | Units  | Assessment Source | Critical Study | Critical Effect                                                                             | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------|-------|--------|-------------------|----------------|---------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 4000  | mg/day | IOM 1997          |                | There is no evidence that individuals consuming this intake may experience adverse effects. | lactating women    | 2720                        | 294000                     | [107]                    | NOTE: IOM identifies Upper Tolerable Intake values for many populations. The lowest UTI was for pregnant women, which is the group used for this CCL Screening Level - this value is reported as mg/day as opposed to mg/kg/day. For this reason, the DWI for pregnant women in units of ml/day is used as opposed to the intake in mg/kg/day. |
| Reference Dose (RfD) or Equivalent | 3500  | mg/day | IOM 1997          |                | There is no evidence that individuals consuming this intake may experience adverse effects. | pregnant women     | 2642                        | 265000                     | [107]                    | NOTE: IOM identifies Upper Tolerable Intake values for many populations. The lowest UTI was for pregnant women, which is the group used for this CCL Screening Level - this value is reported as mg/day as opposed to mg/kg/day. For this reason, the DWI for pregnant women in units of ml/day is used as opposed to the intake in mg/kg/day. |
| Reference Dose (RfD) or Equivalent | 4000  | mg/day | IOM 1997          |                | metastatic calcification, skeletal porosity, interference with calcium absorption           | general population | 2413                        | 332000                     | [107]                    | NOTE: IOM identifies Upper Tolerable Intake values for many populations. The lowest UTI was for pregnant women, which is the group used for this CCL Screening Level - this value is reported as mg/day as opposed to mg/kg/day. For this reason, the DWI for pregnant women in units of ml/day is used as opposed to the intake in mg/kg/day. |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                         | Value | Units | Source | Notes |
|--------------------------------------|-------|-------|--------|-------|
| Measured Data and Assessment Results |       |       |        |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                         | Value | Units | Source   | Notes |
|--------------------------------------|-------|-------|----------|-------|
| Measured Data and Assessment Results |       |       |          |       |
| LD50                                 | 3.03  | mg/kg | NIH HSDB | min   |
| LD50                                 | 4.85  | mg/kg | NIH HSDB | max   |

| Data Element             | Value | Units | Source    | Notes |
|--------------------------|-------|-------|-----------|-------|
| Modeled Data             |       |       |           |       |
| LD50                     |       |       | TEST QSAR |       |
| Ames mutagenicity test   |       |       | TEST QSAR |       |
| Developmental toxin test |       |       | TEST QSAR |       |

Phosphorus  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 | 987                                 | 392                  | Sites                 | 40                      | 42                         | 104                       | 381                          | 5546                       | ug/L        |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 3,889                               | 185                  | Sites                 | 4.76                    | 3                          | 92                        | 680                          | 10100                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 1,278                               | 165                  | Sites                 | 13                      | 3                          | 92                        | 681                          | 10100                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 2,613                               | 20                   | Sites                 | 0.77                    | 10                         | 70                        | 523                          | 1400                       | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) | 250M - 500M                  |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                                  | NA                   | Sites                  | 68                      |                            | 200                       |                              | 700                        | ug/L        |       |
| Community Water System Survey (CWSS) (Finished) [178]         | 2006        | 1                                   | NA                   | Sites                  |                         |                            | 380                       | 380                          |                            | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - WI (Source)                  | 2012-2019   | 1                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 2,063                               | 466                  | Sites                  | 23                      | 1                          | 61                        | 399                          | 15900                      | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 1,357                               | 345                  | Sites                  | 25                      | 1                          | 101                       | 631                          | 380000                     | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 3,413                               | 811                  | Sites                  | 24                      | 1                          | 61                        | 408                          | 380000                     | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                                  | NA                   | Sites                  | 88                      |                            | 70                        |                              | 220                        | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water                              | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expocast exposure                                  |      |                                               |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value | Units | Notes |
|-------------------------------------------------------------------|------------|-------|-------|-------|
| Biodegradation half-life                                          | OPERA QSAR |       |       |       |
| Boiling point                                                     | OPERA QSAR |       |       |       |
| Boiling point                                                     | TEST QSAR  |       |       |       |
| Vapor pressure                                                    | OPERA QSAR |       |       |       |
| Vapor pressure                                                    | TEST QSAR  |       |       |       |
| Solubility in water                                               | OPERA QSAR |       |       |       |
| Solubility in water                                               | TEST QSAR  |       |       |       |
| Bioconcentration factor                                           | OPERA QSAR |       |       |       |
| Bioconcentration factor                                           | TEST QSAR  |       |       |       |
| Henry's Law constant                                              | OPERA QSAR |       |       |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR |       |       |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                  |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. Science of The Total Environment. v581-582, (909-922). |
| 107              | IOM. 1997. Standing Committee on the Scientific Evaluation of Dietary Reference Intakes, Food and Nutrition Board. Dietary Reference Intakes for calcium, phosphorus, magnesium, vitamin D, and fluoride. Institute of Medicine (IOM), National Academy Press, Washington, DC.                  |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                           |

**Phostebupirim**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Phostebupirim                 |
| CASRN:          | 96182-53-5                    |
| DTXSID:         | <a href="#">DTXSID1032482</a> |
| Use:            | Insecticide used on corn      |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              | X |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.21                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 8       | reproductive and developmental effects | 8          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                             | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.03                   | plasma, red blood cell, and brain cholinesterase inhibition | bottle-fed infants | OPP               | 2009                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.006258                     | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Phostebupirim

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value   | Units     | Assessment Source | Critical Study     | Critical Effect                                             | Target Population  | Exposure Factor (mL/kg- | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|---------|-----------|-------------------|--------------------|-------------------------------------------------------------|--------------------|-------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.00002 | mg/kg/day | OPP 2009          | Porter et al. 1991 | plasma, red blood cell, and brain cholinesterase inhibition | bottle-fed infants | 151                     | 0.0265     | [306]                    |       |
| Cancer Classification (CC)         | E       |           | OPP 2009          |                    |                                                             |                    |                         |            | [306]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg- | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                         |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value   | Units     | Source                                  | Notes |
|---------------------------------------------|---------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |         |           |                                         |       |
| Acute Human Health Benchmark                | 0.001   | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.00017 | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.0001  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.0001  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.00002 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 1.3       | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 14        | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 0.125     | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 38.779999 | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 0.0175    | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 5.32      | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 18.87     | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 1         | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 3.5999999 | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 0.3       | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 1         | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value    | Units    | Source    | Notes |
|--------------------------|----------|----------|-----------|-------|
| <b>Modeled Data</b>      |          |          |           |       |
| LD50                     | 0.000278 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | -0.032   | no units | TEST QSAR |       |
| Developmental toxin test | 0.634    | no units | TEST QSAR |       |

## Phostebupirim

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,994                         | 48                | Sites               | 2.41                 | 7.00E - 05              | 0.00144                | 0.00626                   | 0.232                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 338                           | 46                | Sites               | 14                   | 7.00E - 05              | 0.00143                | 0.00581                   | 0.191                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,656                         | 2                 | Sites               | 0.12                 | 0.00029                 | 0.222                  | 0.229                     | 0.232                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 19               | 296,550                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                           | 2001 - 2013 | 15                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)          | 2008 - 2017 | 359                           | 15                | Sites               | 4.18                 | 0.00032                 | 0.00141                | 0.241                     | 0.266                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)            | 2008 - 2017 | 528                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)              | 2008 - 2017 | 887                           | 15                | Sites               | 1.69                 | 0.00032                 | 0.00141                | 0.241                     | 0.266                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated) | 2001 - 2013 | 225                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                        | 2001 - 2013 | 218                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                          | 2001 - 2013 | 8                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Arnold et al. 2016 (Filtered) [7]                                      | 2012 - 2013 | 584                           | 1                 | Sites               | 0.17                 | 3e-04                   | 3e-04                  | 3e-04                     | 3e-04                   | ug/L        |       |
| <b>Waste Water Effluent</b>                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.000000109                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.75549     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 343.127     | degree C                |       |
| Boiling point                                                  | TEST QSAR  |             |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 0.0000536   | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.0000449   | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0000241   | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0000417   | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 33.1025     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 174.582     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000000466 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.53897     | no units                |       |

**Phostebupirim**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 306              | USEPA. 2009. Tebupirimphos (Phostebupirim) in/on Corn, field, pop, sweet. Health Effects Division (HED) Risk Assessment. EPA-HQ-OPP-2008-0940-0010. DP No. D368530. U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Washington, D.C.                                                                                                                                                  |



**Piperonyl butoxide**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                       |
|-----------------|-------------------------------------------------------|
| Name:           | Piperonyl butoxide                                    |
| CASRN:          | 51-03-6                                               |
| DTXSID:         | <a href="#">DTXSID1021166</a>                         |
| Use:            | Synergist for the pyrethrins and related insecticides |
| Chemical Notes: |                                                       |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.000022                   |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 4       | non-cancer effects | 9          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                           | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 900                    | decrease in body weight gain, and increases in alkaline phosphatase activity, liver weight and hepatocellular hypertrophy | general population | OPP               | 2017                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0202                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

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Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

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EPA - Office of Water

Piperonyl butoxide  
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HEALTH EFFECTS DATA

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Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study         | Critical Effect                                                                                                                                  | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.16  | mg/kg/day | OPP 2017          | Goldenthal 1993a and b | decrease in body weight gain, and increases in alkaline phosphatase activity, liver weight and hepatocellular hypertrophy, decreased body weight | general population | 33.8                        | 947        | [389]                    |       |
| Cancer Classification (CC)         | C     |           | OPP 2017          |                        |                                                                                                                                                  |                    |                             |            | [389]                    |       |

Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

Other Health Data

| Data Element                                | Value         | Units     | Source                                  | Notes |
|---------------------------------------------|---------------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |               |           |                                         |       |
| Acute Human Health Benchmark                | 42            | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 6.3           | mg/kg/day | EPA HHBP                                |       |
| Cancer Classification (CC)                  | 3             | no units  | WHO IARC                                |       |
| Chronic Human Health Benchmark              | 0.992         | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.992         | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.155         | mg/kg/day | EPA HHBP                                |       |
| Cancer Classification (CC)                  | Female.Mice N | no units  | HHS NTP                                 |       |
| Cancer Classification (CC)                  | Female.Rats N | no units  | HHS NTP                                 |       |
| Cancer Classification (CC)                  | Male.Mice N   | no units  | HHS NTP                                 |       |
| Cancer Classification (CC)                  | Male.Rats N   | no units  | HHS NTP                                 |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
The full citation for the critical study is provided in the corresponding health assessment.  
PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units     | Source                          | Notes |
|---------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                 |       |
| LD50                                        | 11500 | mg/kg     | NIH HSDB                        | max   |
| LD50                                        | 2600  | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                       | 15.5  | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                       | 500   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                       | 2.9   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                       | 200   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in                | 13.43 | percent   | EPA Chemistry Dashboard         |       |
| TD50                                        | 1180  | mg/kg/day | NIH CPDB                        | min   |
| TD50                                        | 7820  | mg/kg/day | NIH CPDB                        | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0074131 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.08      | no units | TEST QSAR |       |
| Developmental toxin test | 0.43      | no units | TEST QSAR |       |

Technical Support Document for the  
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EPA - Office of Water

Piperonyl butoxide  
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OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date                    | Number of PWS/ Sites/ Samples    | Number of Detects | PWS/Sites/ Samples                                 | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects)  | 90th Percentile (Detects)         | Maximum Conc. (Detects)                            | Conc. Units | Notes                               |
|----------------------------------------------------------------|-------------------------|----------------------------------|-------------------|----------------------------------------------------|----------------------|-------------------------|-------------------------|-----------------------------------|----------------------------------------------------|-------------|-------------------------------------|
| <b>Finished Water</b>                                          |                         |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| <b>Ambient Water</b>                                           |                         |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017             | 1,891                            | 115               | Sites                                              | 6.08                 | 1.00E - 04              | 0.0054                  | 0.0202                            | 0.369                                              | ug/L        |                                     |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017             | 324                              | 107               | Sites                                              | 33                   | 1.00E - 04              | 0.00545                 | 0.0202                            | 0.369                                              | ug/L        |                                     |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017             | 1,567                            | 8                 | Sites                                              | 0.51                 | 0.0015                  | 0.0023                  | 0.0635                            | 0.239                                              | ug/L        |                                     |
| <b>Pesticide Application Data</b>                              | <b>Number of States</b> | <b>Amount Applied (lbs/year)</b> | <b>Date</b>       | <b>Toxic Release Data</b>                          |                      |                         | <b>Number of States</b> | <b>Amount Released (lbs/year)</b> | <b>Chemical Production Data</b>                    |             | <b>Production Volume (lbs/year)</b> |
| Estimated Annual Agricultural Pesticide Use (USGS)             | 3                       | 9,087                            | 2016              | Toxic Release Inventory (TRI) Program (EPA) (2016) |                      |                         | 8                       | 27                                | Chemical Data Reporting (CDR) Results (EPA) (2016) |             | 500K - 1M                           |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 11                            | 1                 | Sites               | 9.09                 | 0.095                   | 0.095                  | 0.095                     | 0.095                   | ug/L        |       |
| Glassmeyer et al 2017 (Finished) [86]                                                  | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 555                           | 90                | Sites               | 16                   | 0.00022                 | 0.0058                 | 0.064                     | 0.47                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 731                           | 7                 | Sites               | 0.96                 | 0.00021                 | 0.00172                | 0.0222                    | 0.0934                  | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 1,286                         | 97                | Sites               | 7.54                 | 0.00021                 | 0.0053                 | 0.0642                    | 0.47                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 6                             | 1                 | Sites               | 17                   | 0.062                   | 0.062                  | 0.062                     | 0.062                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 4                             | 1                 | Sites               | 25                   | 0.062                   | 0.062                  | 0.062                     | 0.062                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 267                           | 78                | Sites               | 29                   | 0.000676                | 0.0184                 | 1.18                      | 11.2                    | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                                                   | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 12                | Sites               | 32                   | 0.0084                  | 0.064                  | 0.118                     | 0.2049                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 584                           | 5                 | Sites               | 0.86                 | 0.0021                  | 0.0024                 | 0.014                     | 0.0196                  | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                                                   | 2011 - 2017 | 21                            | 17                | Sites               | 81                   | 0.0015966               | 0.0254                 | 0.094                     | 0.0989808               | ug/L        |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                   |      | 2.25E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|-------------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 4.73603    | days                    |       |
| Boiling point                                                     | OPERA QSAR | 324.392    | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 393.28     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 8.18E-08   | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.00000708 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0000389  | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0000724  | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 126.704    | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 18.55      | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.00000225 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 4.39613    | no units                |       |

**Piperonyl butoxide**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922).                                                                                                                            |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                                                                                                                                   |
| 389              | USEPA. 2017. Piperonyl Butoxide (PBO). Draft Human Health Risk Assessment Registration Review and for Proposed New Use on Edible Fungi Crop Group 21. EPA-HQ-OPP-2010-0498-0021. DP Nos. D434163 D439507. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                               |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**Potassium**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Potassium                     |
| CASRN:          | 7440-09-7                     |
| DTXSID:         | <a href="#">DTXSID9049748</a> |
| Use:            | Metal, laboratory reagent     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 |                            |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity | Prevalence | Magnitude |
|---------|----------|------------|-----------|
|         |          | 10         | 10        |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect | Target Pop. | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------|-------------|-------------------|----------------------|
|                                                          |                        |                 |             |                   |                      |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 5939                         | 90th Percentile                               | Finished Water                       | NIRS   | 1984-1986 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Potassium

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|              |       |       | HC 2008           |                |                 |                   |                             |            | [93]                     | NOTE: assessment states "no RfD derived because potassium intake from drinking water is well below the level at which adverse health effects may occur." Additional information from the 2019 IOM report for potassium and sodium: Short-term potassium supplementation of approximately 2,500 mg/d (64 mmol/d) on the background of a usual diet appears to be safe for generally healthy individuals. This level of potassium intake would likely be below the UL for individuals without kidney disease, diabetes, heart failure, adrenal insufficiency, or individuals using ACE-Is, ARBs, or other medications that may raise blood potassium concentrations to levels that could lead to adverse effects. There is evidence that very high doses of supplemental potassium ingestion can lead to adverse events, and in extreme cases has led to death, even in the absence of kidney disease or other factors that alter potassium excretion. However, without a specific indicator of a toxicological effect of high potassium intake, a potassium UL cannot be established." |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value | Units  | Assessment Source | Critical Study | Critical Effect                                                                                                                          | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|--------|-------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 4700  | mg/day | IOM 2005          |                | arrhythmias and hyperkalemia in individuals with impaired potassium excretion, detrimental for individuals with impaired kidney function | general population | 2413                        | 390000                     | [109]                    |       |
|                                    |       |        | IOM 2019          |                |                                                                                                                                          |                    |                             |                            | [112]                    |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                         | Value | Units | Source | Notes |
|--------------------------------------|-------|-------|--------|-------|
| Measured Data and Assessment Results |       |       |        |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                         | Value | Units | Source | Notes |
|--------------------------------------|-------|-------|--------|-------|
| Measured Data and Assessment Results |       |       |        |       |

| Data Element             | Value | Units | Source    | Notes |
|--------------------------|-------|-------|-----------|-------|
| Modeled Data             |       |       |           |       |
| LD50                     |       |       | TEST QSAR |       |
| Ames mutagenicity test   |       |       | TEST QSAR |       |
| Developmental toxin test |       |       | TEST QSAR |       |

## Potassium

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 | 989                                 | 958                  | Sites                 | 97                      | 311                        | 1855                      | 5939                         | 23955                      | ug/L        |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 12,092                              | 12,058               | Sites                 | 100                     | 30                         | 2500                      | 7100                         | 640000                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,585                               | 2,573                | Sites                 | 100                     | 30                         | 2670                      | 6940                         | 180000                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9,508                               | 9,486                | Sites                 | 100                     | 60                         | 1960                      | 7520                         | 640000                     | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data              | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|-------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                 |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Glassmeyer et al 2017 (Finished) [86]                 | 2007 - 2012 | 25                                  | NA                   | Sites                  | 100                     |                            | 3070                      |                              | 6870                       | ug/L        |       |
| Community Water System Survey (CWSS) (Finished) [178] | 2006        | 10                                  | NA                   | Sites                  |                         |                            | 2510                      | 4100                         |                            | ug/L        |       |
| <b>Ambient Water</b>                                  |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Glassmeyer et al 2017 (Ambient) [86]                  | 2007 - 2012 | 25                                  | NA                   | Sites                  | 100                     |                            | 2720                      |                              | 6930                       | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                     | 2012 - 2013 | 758                                 | 757                  | Sites                  | 100                     | 80                         | 2300                      | 8618                         | 61200                      | ug/L        |       |
| <b>Waste Water Effluent</b>                           |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                       |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                       |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                       |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water                      | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                       |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Exposure exposure                                  |      |                                               |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

**Potassium**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. Science of The Total Environment. v581-582, (909-922).                                                                                                                                    |
| 93               | HC. 2008. Guidance on Potassium from Water Softeners. Health Canada (HC), Water, Air and Climate Change Bureau, Healthy Environments and Consumer Safety Branch, Ottawa, Ontario, Canada.                                                                                                                                                                                                                                          |
| 109              | IOM. 2005. Dietary Reference Intakes for Water, Potassium, Sodium, Chloride, and Sulfate. Institute of Medicine (IOM), National Academies of Science, Washington, D.C.                                                                                                                                                                                                                                                             |
| 112              | IOM. 2019. Dietary Reference Intakes for Sodium and Potassium (2019). Institute of Medicine (IOM), National Academies of Science, Washington, D.C.                                                                                                                                                                                                                                                                                 |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                                                                                                                                                              |



## Profenofos

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                   |
|-----------------|-----------------------------------|
| Name:           | Profenofos                        |
| CASRN:          | 41198-08-7                        |
| DTXSID:         | <a href="#">DTXSID3032464</a>     |
| Use:            | Pesticide, insecticide, acaricide |
| Chemical Notes: |                                   |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 2.6                        |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 7       | reproductive and developmental effects | 1          | 6         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                          | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.2                    | inhibition of brain acetylcholinesterase | bottle-fed infants | OPP               | 2015                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.5144                       | 90th Percentile                               | Finished Water                       | UCMR4  | 2018-2019 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

## Basis

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Profenofos

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value   | Units     | Assessment Source | Critical Study      | Critical Effect                          | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|---------|-----------|-------------------|---------------------|------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.00012 | mg/kg/day | OPP 2015          | Burdock et al. 1981 | inhibition of brain acetylcholinesterase | bottle-fed infants | 151                         | 0.159      | [351]                    |       |
| Cancer Classification (CC)         | E       |           | OPP 2015          |                     |                                          |                    |                             |            | [351]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value   | Units     | Source                                  | Notes |
|---------------------------------------------|---------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |         |           |                                         |       |
| Acute Human Health Benchmark                | 0.03    | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.005   | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.0003  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.0003  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.00005 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 1.9   | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 700   | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 1     | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 120   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 0.03  | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 30    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 15.19 | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 0.05  | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 0.005 | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0004498 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.137     | no units | TEST QSAR |       |
| Developmental toxin test | 0.615     | no units | TEST QSAR |       |

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 | 3,649                         | 2                 | Sites               | 0.05                 | 0.464                   | 0.492                  | 0.514                     | 0.52                    | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,953                         | 7                 | Sites               | 0.36                 | 0.00019                 | 0.00128                | 0.144                     | 0.21                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 338                           | 5                 | Sites               | 1.48                 | 0.00019                 | 0.00128                | 0.0522                    | 0.128                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,615                         | 2                 | Sites               | 0.12                 | 0.00072                 | 0.105                  | 0.168                     | 0.21                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 1                | 58                        | 2012 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 13                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 303                           | 2                 | Sites               | 0.66                 | 0.209                   | 0.214                  | 0.217                     | 0.219                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 528                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 831                           | 2                 | Sites               | 0.24                 | 0.209                   | 0.214                  | 0.217                     | 0.219                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 8                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 6                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 809                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 584                           | 1                 | Sites               | 0.17                 | 7e-04                   | 7e-04                  | 7e-04                     | 7e-04                   | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.000000144                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|----------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.35324    | days                    |       |
| Boiling point                                                  | OPERA QSAR | 364.071    | degree C                |       |
| Boiling point                                                  | TEST QSAR  |            |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00000174 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.00000244 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0000653  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0000518  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 1513.33    | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 55.0808    | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.0000089  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 4.76488    | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 351              | USEPA. 2015. Profenofos: Human Health Draft Risk Assessment (DRA) for Registration Review. EPA-HQ-OPP-2008-0345-0024. DP No. D414150. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                   |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                    |

**Prometon**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Prometon                      |
| CASRN:          | 1610-18-0                     |
| DTXSID:         | <a href="#">DTXSID6022341</a> |
| Use:            | Herbicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.00015                    |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                  | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 300                    | emesis and decreased body weight | general population | OPP               | 2017                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.046                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Prometon

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study                                          | Critical Effect                  | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|---------------------------------------------------------|----------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.05  | mg/kg/day | OPP 2017          | Breckenridge and Green 1986; Tisdell 1992; Salamon 1987 | emesis and decreased body weight | general population | 33.8                        | 296        | [390]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2017          |                                                         |                                  |                    |                             |            | [390]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units | Source         | Notes |
|---------------------------------------------|-------|-------|----------------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |                |       |
| 10-day Health Advisory                      | 0.2   | mg/L  | EPA DWSHA 2018 |       |
| Chronic Health-Based Guidance Value         | 0.1   | mg/L  | MN DOH         |       |
| Lifetime Health Advisory                    | 0.4   | mg/L  | EPA DWSHA 2018 |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 2980      | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 503       | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 23.299999 | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 737       | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 1.18      | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 120       | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 4.59      | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0026915 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.106     | no units | TEST QSAR |       |
| Developmental toxin test | 0.947     | no units | TEST QSAR |       |

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| Scoring Data                                                   |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 | 295                           | 0                 | Sites              | 0                    |                         |                        |                           |                         | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 11,365                        | 2,286             | Sites              | 20                   | 0                       | 0.01                   | 0.046                     | 40                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,297                         | 1,377             | Sites              | 60                   | 0                       | 0.01                   | 0.044                     | 25.1                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9,069                         | 909               | Sites              | 10                   | 0.00033                 | 0.011                  | 0.078                     | 40                      | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 1                | 0.22                      | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

| Non-Scoring Data                                                                       |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| <b>Finished Water</b>                                                                  |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 49                            | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 11                | Sites              | 65                   | 0.00028                 | 0.0025                 | 0.009                     | 0.092                   | ug/L        |       |
| Bradley et al. 2018 (Finished) [53]                                                    | 2016        | 26                            | 1                 | Sites              | 3.85                 | 0.0084                  | 0.0084                 | 0.0084                    | 0.0084                  | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 1                 | Sites              | 100                  | 0.01                    | 0.01                   | 0.01                      | 0.01                    | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 450                           | 4                 | Sites              | 0.89                 | 0.1                     | 0.11                   | 0.12                      | 0.12                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 1,613                         | 594               | Sites              | 37                   | 0.00015                 | 0.009                  | 0.05                      | 6.51                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 3,729                         | 320               | Sites              | 8.58                 | 0.00059                 | 0.01                   | 0.05                      | 0.495                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 5,341                         | 914               | Sites              | 17                   | 0.00015                 | 0.009                  | 0.05                      | 6.51                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 82                | Sites              | 36                   | 0.00028                 | 0.0025                 | 0.013                     | 0.891                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 74                | Sites              | 34                   | 0.00028                 | 0.0011                 | 0.0056                    | 0.054                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 8                 | Sites              | 67                   | 0.00028                 | 0.0025                 | 0.013                     | 0.891                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 4,469                         | 98                | Sites              | 2.19                 | 0.006                   | 0.0873                 | 0.276                     | 1.6                     | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 18                | Sites              | 47                   | 0.0049                  | 0.00695                | 0.0295                    | 0.133                   | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 64                | Sites              | 9.28                 | 4e-04                   | 0.0036                 | 0.0126                    | 0.0438                  | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 2                 | Sites              | 100                  | 0.01                    | 0.01                   | 0.015                     | 0.02                    | ug/L        |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                                     | 2002 - 2010 | 133                           | 19                | Samples            | 14                   |                         |                        |                           | 0.06                    | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                                                   | 2011 - 2017 | 21                            | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | Date        | Source                        | Value             | Units              | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Exposure exposure                                  |      | 7.95E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.81769     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 336.341     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 329.884     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.00000249  | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.000000752 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.00205423  | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.00400867  | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 3.05344     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 7.8886      | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 1.75E-08    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 3.05368     | no units                |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

**Prometon**

CCL 5 Contaminant Information Sheet

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985.                                                                    |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                                                                                                                                   |
| 390              | USEPA. 2017. Prometon. Chronic Dietary (Drinking Water Only) Exposure and Risk Assessment for the Registration Review Draft Risk Assessment. EPA-HQ-OPP-2013-0068-0015. DP No. D443014. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                 |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |



**Prometryn**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                         |
|-----------------|-------------------------------------------------------------------------|
| Name:           | Prometryn                                                               |
| CASRN:          | 7287-19-6                                                               |
| DTXSID:         | <a href="#">DTXSID4024272</a>                                           |
| Use:            | Herbicide for most annual grasses, broadleaf weeds in cotton and celery |
| Chemical Notes: |                                                                         |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.00025                    |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 9          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                             | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 200                    | renal and hepatic degenerative changes, bone marrow atrophy | general population | OPP               | 2013                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.051                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Prometryn

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study      | Critical Effect                                             | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|---------------------|-------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.04  | mg/kg/day | OPP 2013          | Woodard et al. 1965 | renal and hepatic degenerative changes, bone marrow atrophy | general population | 33.8                        | 237        | [329]                    |       |
| Cancer Classification (CC)         | E     |           | OPP 2013          |                     |                                                             |                    |                             |            | [329]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 3.3   | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.12  | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.3   | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.3   | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.04  | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 1265  | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 5233  | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 37.5  | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 72    | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 0.7   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 37.25 | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 7.17  | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0075858 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.177     | no units | TEST QSAR |       |
| Developmental toxin test | 0.57      | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Prometryn  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 5,273                         | 139               | Sites               | 2.64                 | 0.00017                 | 0.007                  | 0.051                     | 3.73                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 712                           | 106               | Sites               | 15                   | 0.00017                 | 0.007                  | 0.053                     | 3.73                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 4,561                         | 33                | Sites               | 0.72                 | 0.00048                 | 0.006                  | 0.0279                    | 0.277                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 20               | 1,458,440                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 2                | 860                        | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 99                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 5                 | Sites               | 29                   | 0.00028                 | 0.025                  | 0.0866                    | 0.231                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 1,207                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 880                           | 53                | Sites               | 6.02                 | 0.00017                 | 0.009                  | 0.119                     | 0.658                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 2,579                         | 15                | Sites               | 0.58                 | 0.00015                 | 0.006                  | 0.0108                    | 0.037                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 3,458                         | 68                | Sites               | 1.97                 | 0.00015                 | 0.008                  | 0.0993                    | 0.658                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 8                 | Sites               | 3.49                 | 0.00028                 | 0.00028                | 0.00552                   | 0.118                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 8                 | Sites               | 67                   | 0.00028                 | 0.00028                | 0.00552                   | 0.118                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 3,433                         | 92                | Sites               | 2.68                 | 0.0031                  | 0.122                  | 0.756                     | 20                      | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 2                 | Sites               | 5.26                 | 0.0032                  | 0.0159                 | 0.0261                    | 0.0286                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 0.000000069                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.74373     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 338.854     | degree C                |       |
| Boiling point                                                  | TEST QSAR  |             |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00000143  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000000959 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000138089 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.000322849 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 12.3056     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 9.35406     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 2.33E-08    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.60968     | no units                |       |

**Prometryn**

CCL 5 Contaminant Information Sheet

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 329              | USEPA. 2013. Prometryn. Human-Health Assessment Scoping Document in Support of Registration Review. EPA-HQ-OPP-2013-0032-0006. DP No. D407422. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                          |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**Pronamide**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                          |
|-----------------|----------------------------------------------------------|
| Name:           | Pronamide                                                |
| CASRN:          | 23950-58-5                                               |
| DTXSID:         | <a href="#">DTXSID2020420</a>                            |
| Use:            | Selective herbicide used on annual and perennial grasses |
| Chemical Notes: |                                                          |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.00026                    |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 5       | reproductive and developmental effects | 7          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                                | Target Pop.               | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------|----------------------|
| HRL                                                      | 200                    | decreases in body weight, weight gain, and food consumption; increased liver weight and lesions in liver, thyroid, and ovaries | women of childbearing age | OPP               | 2015                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.052                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Pronamide

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study           | Critical Effect                                                                                                             | Target Population         | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.04  | mg/kg/day | OPP 2015          | Andrus and Hukkanen 2011 | decreases in body weight, weight gain, and food consumption; increased liver weight; lesions in liver, thyroid, and ovaries | women of childbearing age | 35.4                        | 226        | [352]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2015          |                          |                                                                                                                             |                           |                             |            | [352]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| 10-day Health Advisory                      | 0.8   | mg/L      | EPA DWSHA 2018                          |       |
| Acute Human Health Benchmark                | 0.3   | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.04  | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.3   | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.3   | mg/L      | Health-based screening levels from USGS |       |
| Lifetime Health Advisory                    | 0.001 | mg/L      | EPA DWSHA 2018                          |       |
| Population-Adjusted Dose (PAD)              | 0.04  | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 5600  | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 8350  | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 123.2 | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 20    | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 17.5  | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 5     | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 8.08  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 60    | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 15    | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0070632 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.667     | no units | TEST QSAR |       |
| Developmental toxin test | 0.574     | no units | TEST QSAR |       |

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OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 11,233                        | 143               | Sites               | 1.27                 | 0.00021                 | 0.009                  | 0.052                     | 1.35                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,224                         | 133               | Sites               | 5.98                 | 0.00021                 | 0.009                  | 0.0512                    | 1.35                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9,009                         | 10                | Sites               | 0.11                 | 0.0012                  | 0.00695                | 0.23                      | 0.82                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 3                | 137,018                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 4                | 0.35                       | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 13                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 1,020                         | 22                | Sites               | 2.16                 | 7.00E - 04              | 0.0104                 | 0.24                      | 5.75                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 3,065                         | 2                 | Sites               | 0.07                 | 0.0075                  | 0.0146                 | 0.0188                    | 0.0216                  | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 4,084                         | 24                | Sites               | 0.59                 | 7.00E - 04              | 0.0104                 | 0.234                     | 5.75                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 8                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 6                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 641                           | 49                | Sites               | 7.64                 | 0.005                   | 0.017                  | 0.0448                    | 0.25                    | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 1                 | Sites               | 2.63                 | 0.1134                  | 0.113                  | 0.113                     | 0.1134                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                                     | 2002 - 2010 | 133                           | 1                 | Samples             | 0.8                  |                         |                        |                           | 0.014                   | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 1.59E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.30719     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 312.471     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 339.245     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000000538 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.00000364  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0000887   | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.000169044 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 56.9152     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  |             |                         |       |
| Henry's Law constant                                           | OPERA QSAR | 1.53E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.32595     | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 352              | USEPA. 2015. Pronamide. Human Health Risk Assessment for Registration Review and to Support New Section 3 Use on Leaf Lettuce (Revised). EPA-HQ-OPP-2009-0326-0017. DP Nos. D422207 D410291. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                            |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |



**Propachlor**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                                              |
|-----------------|----------------------------------------------------------------------------------------------|
| Name:           | Propachlor                                                                                   |
| CASRN:          | 1918-16-7                                                                                    |
| DTXSID:         | <a href="#">DTXSID4024274</a>                                                                |
| Use:            | selective herbicide used for preemergence weed control of annual grasses and broadleaf weeds |
| Chemical Notes: |                                                                                              |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| List                     | 1.3                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 4       | carcinogen with linear MOA | 1          | 5         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.9                    | ovarian tumors  | general population | OPP               | 1998                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 1.18                         | 90th Percentile                               | Finished Water                       | UCM2   | 1993-1997 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Propachlor

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units          | Assessment Source | Critical Study        | Critical Effect                                          | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|----------------|-------------------|-----------------------|----------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.054 | mg/kg/day      | OPP 1998          | Naylor and Thake 1996 | stomach lesions in males and liver lesions in both sexes | general population | 33.8                        | 320        | [231]                    |       |
| Cancer Slope Factor (CSF)          | 0.032 | (mg/kg/day)^-1 | OPP 1998          | Hamada 1987           | ovarian tumors                                           | general population | 33.8                        | 0.925      | [231]                    |       |
| Cancer Classification (CC)         | L     |                | OPP 1998          |                       |                                                          |                    |                             |            | [231]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units | Source         | Notes |
|---------------------------------------------|-------|-------|----------------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |                |       |
| 10-day Health Advisory                      | 0.5   | mg/L  | EPA DWSHA 2018 |       |
| Chronic Health-Based Guidance Value         | 0.09  | mg/L  | MN DOH         |       |
| Lifetime Health Advisory                    | 0.001 | mg/L  | EPA DWSHA 2018 |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 1800  | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 290   | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 125.3 | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 25    | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 5     | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 65.5  | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 37.97 | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0016181 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.347     | no units | TEST QSAR |       |
| Developmental toxin test | 0.777     | no units | TEST QSAR |       |

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| Scoring Data                                                   |             |                               |                           |                    |                                                    |                         |                        |                            |                                                    |             |                              |
|----------------------------------------------------------------|-------------|-------------------------------|---------------------------|--------------------|----------------------------------------------------|-------------------------|------------------------|----------------------------|----------------------------------------------------|-------------|------------------------------|
| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects         | PWS/Sites/ Samples | Percent with Detects                               | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects)  | Maximum Conc. (Detects)                            | Conc. Units | Notes                        |
| <b>Finished Water</b>                                          |             |                               |                           |                    |                                                    |                         |                        |                            |                                                    |             |                              |
|                                                                |             |                               | Prevalence                |                    |                                                    |                         |                        | Magnitude                  |                                                    |             |                              |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                           |                    |                                                    |                         |                        |                            |                                                    |             |                              |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                           |                    |                                                    |                         |                        |                            |                                                    |             |                              |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                           |                    |                                                    |                         |                        |                            |                                                    |             |                              |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                           |                    |                                                    |                         |                        |                            |                                                    |             |                              |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 | 12,050                        | 6                         | Sites              | 0.05                                               | 0.1                     | 0.11                   | 1.18                       | 2.5                                                | ug/L        |                              |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                           |                    |                                                    |                         |                        |                            |                                                    |             |                              |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                           |                    |                                                    |                         |                        |                            |                                                    |             |                              |
| <b>Ambient Water</b>                                           |             |                               |                           |                    |                                                    |                         |                        |                            |                                                    |             |                              |
|                                                                |             |                               | Prevalence                |                    |                                                    |                         |                        | Magnitude                  |                                                    |             |                              |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 8,480                         | 98                        | Sites              | 1.16                                               | 0.001                   | 0.008                  | 0.0912                     | 2.99                                               | ug/L        |                              |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 1,867                         | 92                        | Sites              | 4.93                                               | 0.001                   | 0.0085                 | 0.0918                     | 2.99                                               | ug/L        |                              |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 6,614                         | 6                         | Sites              | 0.09                                               | 0.002                   | 0.0055                 | 0.033                      | 0.057                                              | ug/L        |                              |
|                                                                |             |                               |                           |                    |                                                    |                         |                        |                            |                                                    |             |                              |
| Pesticide Application Data                                     |             | Number of States              | Amount Applied (lbs/year) | Date               | Toxic Release Data                                 |                         | Number of States       | Amount Released (lbs/year) | Chemical Production Data                           |             | Production Volume (lbs/year) |
| Estimated Annual Agricultural Pesticide Use (USGS)             |             | 4                             | 120,862                   | 2005               | Toxic Release Inventory (TRI) Program (EPA) (2016) |                         | 2                      | 15                         | Chemical Data Reporting (CDR) Results (EPA) (2016) |             |                              |

| Non-Scoring Data                                                                       |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               | Prevalence        |                     |                      |                         |                        | Magnitude                 |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 180                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - MA (Finished)                                         | 2006 - 2020 | 822                           | 1                 | Sites               | 0.12                 | 0.093                   | 0.093                  | 0.093                     | 0.093                   | ug/L        |       |
| Drinking Water Monitoring Data - WA (Finished)                                         | 2006 - 2011 | 822                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 3                 | Sites               | 18                   | 0.00107                 | 0.00107                | 0.145                     | 0.287                   | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               | Prevalence        |                     |                      |                         |                        | Magnitude                 |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 2,047                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - MA (Source)                                           | 2006 - 2020 | 78                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WA (Source)                                           | 2006 - 2011 | 997                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WI (Source)                                           | 2012-2019   | 92                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 313                           | 2                 | Sites               | 0.64                 | 0.002                   | 0.041                  | 0.0644                    | 0.08                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 812                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 1,125                         | 2                 | Sites               | 0.18                 | 0.002                   | 0.041                  | 0.0644                    | 0.08                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 2                 | Sites               | 0.87                 | 0.00107                 | 0.00298                | 0.00452                   | 0.0049                  | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 2                 | Sites               | 17                   | 0.00107                 | 0.00298                | 0.00452                   | 0.0049                  | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 707                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               | Prevalence        |                     |                      |                         |                        | Magnitude                 |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 6.56E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.36055     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 292.103     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 300.836     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000341887 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000100925 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00447549  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00156675  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 32.0372     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 20.797      | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000000124 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.28865     | no units                |       |

**Propachlor**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                  |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 231              | USEPA. 1998. Reregistration Eligibility Decision (RED) Propachlor. EPA 738-R-015. U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Washington, D.C.                                                                                                                                 |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society. |

**Propanil**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Propanil                      |
| CASRN:          | 709-98-8                      |
| DTXSID:         | <a href="#">DTXSID8022111</a> |
| Use:            | Post emergent herbicide       |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 1.4                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 5       | reproductive and developmental effects | 7          | 8         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                               | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 50                     | increased methemoglobin; increased spleen weight in females; and enlarged seminal vesicles/prostates in males | general population | OPP               | 2006                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|------|
| 72                           |                                               | EEC SW 30-Year                       | OPP    | 2006 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Propanil

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study  | Critical Effect                                                                                               | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|-----------------|---------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.009 | mg/kg/day | OPP 2006          | Bellringer 1994 | increased methemoglobin; increased spleen weight in females; and enlarged seminal vesicles/prostates in males | general population | 33.8                        | 53.3       | [264]                    |       |
| Cancer Classification (CC)         | S     |           | OPP 2006          |                 |                                                                                                               |                    |                             |            | [264]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Chronic Human Health Benchmark              | 0.06  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.06  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.009 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 1384  | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 360   | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 100   | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 5     | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 15    | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 20    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 12.91 | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 49    | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 9.6   | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value    | Units    | Source    | Notes |
|--------------------------|----------|----------|-----------|-------|
| <b>Modeled Data</b>      |          |          |           |       |
| LD50                     | 0.003767 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | -0.006   | no units | TEST QSAR |       |
| Developmental toxin test | 0.688    | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Propanil  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 7                | 6,860,055                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 4                | 79,889                     | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects                      | Minimum Conc. (Detects)                                                                                                                                                                                                                                                                                                        | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                                           |                                                                                                                                                                                                                                                                                                                                |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 1                             | 0                 | Sites               | 0                                         |                                                                                                                                                                                                                                                                                                                                |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 16                            | 6                 | Sites               | 38                                        | 0.0112                                                                                                                                                                                                                                                                                                                         | 0.042                  | 0.116                     | 0.17                    | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                                           |                                                                                                                                                                                                                                                                                                                                |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 1                             | 0                 | Sites               | 0                                         |                                                                                                                                                                                                                                                                                                                                |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 936                           | 23                | Sites               | 2.46                                      | 0.00188                                                                                                                                                                                                                                                                                                                        | 0.0354                 | 0.574                     | 6.5                     | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 2,045                         | 0                 | Sites               | 0                                         |                                                                                                                                                                                                                                                                                                                                |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 2,980                         | 23                | Sites               | 0.77                                      | 0.00188                                                                                                                                                                                                                                                                                                                        | 0.0354                 | 0.574                     | 6.5                     | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 228                           | 0                 | Sites               | 0                                         |                                                                                                                                                                                                                                                                                                                                |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 0                 | Sites               | 0                                         |                                                                                                                                                                                                                                                                                                                                |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 11                            | 0                 | Sites               | 0                                         |                                                                                                                                                                                                                                                                                                                                |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 1,424                         | 201               | Sites               | 14                                        | 0.004                                                                                                                                                                                                                                                                                                                          | 0.591                  | 5.68                      | 57.6                    | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 1                 | Sites               | 2.63                                      | 3.0096                                                                                                                                                                                                                                                                                                                         | 3.01                   | 3.01                      | 3.0096                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 0                 | Sites               | 0                                         |                                                                                                                                                                                                                                                                                                                                |                        |                           |                         |             |       |
| Southeast Stream Quality Assessment (SESQA) (Ambient) [102]                            | 2014        | 77                            | 1                 | Sites               | 1.3                                       | 0.0020539                                                                                                                                                                                                                                                                                                                      | 0.00205                | 0.00205                   | 0.0020539               | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                                           |                                                                                                                                                                                                                                                                                                                                |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                                           |                                                                                                                                                                                                                                                                                                                                |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | Date        | Source                        | Value             | Units               | Model                                     | Notes                                                                                                                                                                                                                                                                                                                          |                        |                           |                         |             |       |
| Estimated Environmental Concentration (EEC) in Surface Water, 30-Year Mean             | 2006        | OPP                           | 72                | ug/L                | Exposure Analysis Modeling System (EXAMS) | The modeled surface water 30-year mean estimated environmental concentration provided by the EPA OPP health assessment was selected as the occurrence value for propanil. This value coincides with the chronic health effects data and was considered the most appropriate for estimates of chronic drinking water exposures. |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 6.68E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.50968     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 341.956     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 325.947     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00000055  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.00000265  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000730631 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.000447713 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 53.3998     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 16.9824     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 1.79E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.219       | no units                |       |

**Propanil**

CCL 5 Contaminant Information Sheet

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 102              | <a href="https://webapps.usgs.gov/rsqa/#!/region/SESQA">https://webapps.usgs.gov/rsqa/#!/region/SESQA</a>                                                                                                                                                                                                                                                                                                                          |
| 264              | USEPA. 2006. Amendment to the Reregistration Eligibility Decision (RED) for Propanil (March 2006) and the Propanil RED (September 2003). EPA-HQ-OPP-2003-0348. U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Washington, D.C.                                                                                                                                                       |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |



**Propargite**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Propargite                    |
| CASRN:          | 2312-35-8                     |
| DTXSID:         | <a href="#">DTXSID4024276</a> |
| Use:            | Insecticide                   |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 2.8                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 5       | carcinogen with linear MOA | 6          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.2                    | jejunal tumors  | general population | OPP               | 2019                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.5508                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Propargite

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units                     | Assessment Source | Critical Study                | Critical Effect                         | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|---------------------------|-------------------|-------------------------------|-----------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.04  | mg/kg/day                 | OPP 2019          | Trutter 1991; Goldenthal 1993 | decreased pup weight in all generations | bottle-fed infants | 151                         | 53.0       | [424]                    |       |
| Cancer Slope Factor (CSF)          | 0.192 | (mg/kg/day) <sup>-1</sup> | OPP 2019          | Goldenthal 1993               | jejunal tumors                          | general population | 33.8                        | 0.154      | [424]                    |       |
| Cancer Classification (CC)         | B2    |                           | OPP 2019          |                               |                                         |                    |                             |            | [424]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value    | Units | Source                                  | Notes |
|---------------------------------------------|----------|-------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |          |       |                                         |       |
| Health-Based Screening Level                | 0.3      | mg/L  | Health-based screening levels from USGS |       |
| Health-Based Screening Level                | 0.000167 | mg/L  | Health-based screening levels from USGS |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 1480  | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 2947  | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 105   | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 6     | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 2     | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 25    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 32.06 | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value    | Units    | Source    | Notes |
|--------------------------|----------|----------|-----------|-------|
| <b>Modeled Data</b>      |          |          |           |       |
| LD50                     | 0.011885 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   |          |          | TEST QSAR |       |
| Developmental toxin test | 0.793    | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Propargite  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 10,698                        | 73                | Sites               | 0.68                 | 6.00E - 04              | 0.044                  | 0.551                     | 20                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,055                         | 70                | Sites               | 3.41                 | 6.00E - 04              | 0.044                  | 0.56                      | 20                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 8,643                         | 3                 | Sites               | 0.03                 | 0.008                   | 0.009                  | 0.174                     | 0.245                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 18               | 8,790,953                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 2                | 165                        | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 13                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 891                           | 7                 | Sites               | 0.79                 | 0.00169                 | 0.106                  | 0.199                     | 0.212                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 2,018                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 2,908                         | 7                 | Sites               | 0.24                 | 0.00169                 | 0.106                  | 0.199                     | 0.212                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 8                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 6                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 1,146                         | 65                | Sites               | 5.67                 | 0.0084                  | 0.086                  | 1.45                      | 20                      | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 0.000000139                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 5.67573     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 362.004     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 325.241     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000000359 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.00000018  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00000239  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00000271  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 10.8905     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  |             |                         |       |
| Henry's Law constant                                           | OPERA QSAR | 0.00000979  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 4.882       | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 424              | USEPA. 2019. Propargite: Draft Human Health Risk Assessment in Support of Registration Review. EPA-HQ-OPP-2014-0131-0051. DP No. D449759. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                               |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                    |

**Propazine**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                    |
|-----------------|------------------------------------|
| Name:           | Propazine                          |
| CASRN:          | 139-40-2                           |
| DTXSID:         | <a href="#">DTXSID3021196</a>      |
| Use:            | Selective post-emergence herbicide |
| Chemical Notes: |                                    |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.0005                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 5       | reproductive and developmental effects | 10         | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect         | Target Pop.               | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------|---------------------------|-------------------|----------------------|
| HRL                                                      | 100                    | attenuation of LH surge | women of childbearing age | OPP               | 2015                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.05                         | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Propazine

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study                                                             | Critical Effect         | Target Population         | Exposure Factor (mL/kg-) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|----------------------------------------------------------------------------|-------------------------|---------------------------|--------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0242 | mg/kg/day | OPP 2015          | national health and environmental effects research laboratory; Morales and | attenuation of LH surge | women of childbearing age | 35.4                     | 137        | [353]                    |       |
| Cancer Classification (CC)         | NL     |           | OPP 2015          |                                                                            |                         |                           |                          |            | [353]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|--------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                          |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units  | Source                         | Notes |
|---------------------------------------------|-------|--------|--------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |        |                                |       |
| Lifetime Health Advisory                    | 0.01  | mg/L   | EPA DWSHA 2018                 |       |
| Maximum Allowable Daily Level               | 100   | ug/day | CalEPA OEHHA Chemical Database |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                      | Value | Units     | Source                          | Notes |
|---------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |       |           |                                 |       |
| LD50                                              | 1200  | mg/kg     | NIH HSDB                        | min   |
| LD50                                              | 15380 | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                             | 450   | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                             | 50    | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                             | 150   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                             | 5     | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxicant in vitro assays tested | 3.67  | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value    | Units    | Source    | Notes |
|--------------------------|----------|----------|-----------|-------|
| <b>Modeled Data</b>      |          |          |           |       |
| LD50                     | 0.006368 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.045    | no units | TEST QSAR |       |
| Developmental toxin test | 0.695    | no units | TEST QSAR |       |

### OCCURRENCE DATA

### Scoring Data

| Scoring Data                                                   |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 2,165                         | 260               | Sites              | 12                   | 2.00E - 04              | 0.0051                 | 0.05                      | 1.79                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 462                           | 209               | Sites              | 45                   | 2.00E - 04              | 0.00514                | 0.05                      | 1.79                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,703                         | 51                | Sites              | 2.99                 | 0.00025                 | 0.00246                | 0.265                     | 1.69                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 7                | 637,396                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

### Non-Scoring Data

| Non-Storing Data                                                                       |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|----------------------------------------------------------------------------------------|--|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Non-Nationally Representative Water Data                                               |  | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| <b>Finished Water</b>                                                                  |  |             | <b>Prevalence</b>             |                   |                     |                      | <b>Magnitude</b>        |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         |  | 2006 - 2020 | 4                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           |  | 2001 - 2013 | 10                            | 7                 | Sites               | 70                   | 7e-04                   | 0.0028                 | 0.013                     | 0.032                   | ug/L        |       |
|                                                                                        |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |  |             | <b>Prevalence</b>             |                   |                     |                      | <b>Magnitude</b>        |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           |  | 2006 - 2020 | 19                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          |  | 2008 - 2017 | 426                           | 115               | Sites               | 27                   | 0.00021                 | 0.007                  | 0.05                      | 0.39                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            |  | 2008 - 2017 | 817                           | 44                | Sites               | 5.39                 | 0.00026                 | 0.01                   | 0.03                      | 0.0894                  | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              |  | 2008 - 2017 | 1,243                         | 159               | Sites               | 13                   | 0.00021                 | 0.00716                | 0.05                      | 0.39                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 |  | 2001 - 2013 | 227                           | 14                | Sites               | 6.17                 | 7e-04                   | 0.0055                 | 0.013                     | 0.071                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        |  | 2001 - 2013 | 219                           | 7                 | Sites               | 3.2                  | 7e-04                   | 0.00105                | 0.0111                    | 0.023                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          |  | 2001 - 2013 | 10                            | 7                 | Sites               | 70                   | 7e-04                   | 0.0055                 | 0.013                     | 0.071                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] |  | 1990 - 2018 | 68                            | 2                 | Sites               | 2.94                 | 1.1                     | 1.55                   | 1.91                      | 2                       | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     |  | 2012 - 2014 | 38                            | 3                 | Sites               | 7.89                 | 0.03                    | 0.036                  | 0.04                      | 0.041                   | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      |  | 2012 - 2013 | 584                           | 9                 | Sites               | 1.54                 | 5e-04                   | 0.001                  | 0.00266                   | 0.0029                  | ug/L        |       |
|                                                                                        |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |  |             | <b>Prevalence</b>             |                   |                     |                      | <b>Magnitude</b>        |                        |                           |                         |             |       |
|                                                                                        |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                |  | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                                        |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Exnocast exposure                                  |      | 7.85F-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMB 4 data used in the draft CCI 5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 4.96717     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 338.333     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 318.777     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.000000183 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.000000593 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000053    | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000355631 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 13.2841     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 13.3352     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 1.24E-08    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 3.08299     | no units                |       |

**Propazine**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 353              | USEPA. 2015. Propazine. Acute and Chronic Dietary (Food Only) Exposure Assessments for Registration Review. EPA-HQ-OPP-2013-0250-0070. DP D428624. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                      |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |



**Propiconazole**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                        |                               |
|------------------------|-------------------------------|
| <b>Name:</b>           | Propiconazole                 |
| <b>CASRN:</b>          | 60207-90-1                    |
| <b>DTXSID:</b>         | <a href="#">DTXSID8024280</a> |
| <b>Use:</b>            | Fungicide                     |
| <b>Chemical Notes:</b> |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                                 |                                   |
|---------------------------------|-----------------------------------|
| <b>Draft CCL5 List Decision</b> | <b>Final Hazard Quotient (HQ)</b> |
| Not List                        | 0.000065                          |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 4       | non-cancer effects | 9          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                              | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 600                    | Liver toxicity; increased liver weight in males, and increase in liver lesions (masses/raised areas/swellings/nodular areas) | general population | OPP               | 2019                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.039                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                          |
|--------------------------|
| <b>Public Nomination</b> |
|                          |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Propiconazole

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study              | Critical Effect                                                                                                               | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.1   | mg/kg/day | OPP 2019          | Ciba Geigy Corporation 1982 | Liver toxicity; increased liver weight in males, and increase in liver lesions (masses/raised areas/ swellings/nodular areas) | general population | 33.8                        | 592        | [425]                    |       |
| Cancer Classification (CC)         | C     |           | OPP 2019          |                             |                                                                                                                               |                    |                             |            | [425]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 2     | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.3   | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.6   | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.6   | mg/L      | Health-based screening levels from USGS |       |
| Health-Based Screening Level                | 0.6   | mg/L      | Health-based screening levels from USGS |       |
| Health-Based Screening Level                | 0.6   | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.1   | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 1490      | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 1517      | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 300       | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 8.3999996 | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 1.9       | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 100       | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 19.93     | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 6.25      | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 77.589996 | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 1.25      | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 16.82     | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0040551 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.333     | no units | TEST QSAR |       |
| Developmental toxin test | 0.484     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Propiconazole  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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| Scoring Data                                                   |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |  |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|--|--|
| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |  |  |
| Finished Water                                                 |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |  |  |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |  |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |  |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |  |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |  |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |  |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |  |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |  |  |
| Ambient Water                                                  |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |  |  |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 3,055                         | 101               | Sites              | 3.31                 | 0.001                   | 0.009                  | 0.039                     | 1.23                    | ug/L        |       |  |  |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 190                           | 95                | Sites              | 50                   | 0.001                   | 0.009                  | 0.039                     | 1.23                    | ug/L        |       |  |  |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 2,865                         | 6                 | Sites              | 0.21                 | 0.003                   | 0.0075                 | 0.018                     | 0.024                   | ug/L        |       |  |  |

| Pesticide Application Data                         |  | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 |  | Number of States | Amount Released (lbs/year) | Chemical Production Data                           |  | Production Volume (lbs/year) |
|----------------------------------------------------|--|------------------|---------------------------|------|----------------------------------------------------|--|------------------|----------------------------|----------------------------------------------------|--|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |  | 48               | 2,454,476                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |  | 11               | 40,199                     | Chemical Data Reporting (CDR) Results (EPA) (2016) |  |                              |

| Non-Scoring Data                                                                       |  |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|----------------------------------------------------------------------------------------|--|--|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| Non-Nationally Representative Water Data                                               |  |  | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
| Finished Water                                                                         |  |  |             |                               | Prevalence        |                     |                      |                         | Magnitude              |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           |  |  | 2001 - 2013 | 17                            | 5                 | Sites               | 29                   | 0.0057                  | 0.0057                 | 0.012                     | 0.029                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           |  |  | 2001 - 2013 | 11                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           |  |  | 2001 - 2013 | 11                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Bradley et al. 2018 (Finished) [53]                                                    |  |  | 2016        | 26                            | 2                 | Sites               | 7.69                 | 0.0141                  | 0.0154                 | 0.0165                    | 0.0168                  | ug/L        |       |
| Ambient Water                                                                          |  |  |             |                               | Prevalence        |                     |                      |                         | Magnitude              |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          |  |  | 2008 - 2017 | 832                           | 187               | Sites               | 22                   | 0.00041                 | 0.0116                 | 0.103                     | 3.72                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            |  |  | 2008 - 2017 | 1,796                         | 11                | Sites               | 0.61                 | 0.003                   | 0.0065                 | 0.0331                    | 0.075                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              |  |  | 2008 - 2017 | 2,627                         | 198               | Sites               | 7.54                 | 0.00041                 | 0.0112                 | 0.1                       | 3.72                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 |  |  | 2001 - 2013 | 229                           | 10                | Sites               | 4.37                 | 0.005661                | 0.01                   | 0.027                     | 0.1916                  | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        |  |  | 2001 - 2013 | 219                           | 5                 | Sites               | 2.28                 | 0.005661                | 0.0057                 | 0.134                     | 0.1916                  | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          |  |  | 2001 - 2013 | 12                            | 5                 | Sites               | 42                   | 0.0057                  | 0.01                   | 0.0195                    | 0.07                    | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] |  |  | 1990 - 2018 | 134                           | 13                | Sites               | 9.7                  | 0.02                    | 0.0298                 | 0.0452                    | 0.051                   | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     |  |  | 2012 - 2014 | 38                            | 8                 | Sites               | 21                   | 0.0029                  | 0.0127                 | 0.0662                    | 0.13                    | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     |  |  | 2012 - 2014 | 38                            | 6                 | Sites               | 16                   | 0.0202                  | 0.0644                 | 0.271                     | 0.4045                  | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     |  |  | 2012 - 2014 | 38                            | 8                 | Sites               | 21                   | 0.005                   | 0.0174                 | 0.115                     | 0.217                   | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      |  |  | 2012 - 2013 | 902                           | 6                 | Sites               | 0.67                 | 0.0023                  | 0.00845                | 0.0225                    | 0.031                   | ug/L        |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                                     |  |  | 2002 - 2010 | 42                            | 3                 | Samples             | 7.1                  |                         |                        |                           | 0.051                   | ug/L        |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                                     |  |  | 2002 - 2010 | 42                            | 3                 | Samples             | 7.1                  |                         |                        |                           | 0.08                    | ug/L        |       |
| Waste Water Effluent                                                                   |  |  |             |                               | Prevalence        |                     |                      |                         | Magnitude              |                           |                         |             |       |
|                                                                                        |  |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       |  |  | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |  |  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard)     |  | Date                         | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-----------------------------------------------------|--|------------------------------|-----------------------------------------|-------|
| Exposure exposure                                   |  |                              | 1.63E-08                                |       |
| Biomonitoring Data                                  |  | Detection at 90th Percentile | Units                                   | Notes |
| NHANES biomonitoring detection in serum (1999-2016) |  |                              |                                         |       |
| NHANES biomonitoring detection in blood (1999-2016) |  |                              |                                         |       |
| NHANES biomonitoring detection in urine (1999-2016) |  |                              |                                         |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) |  | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|--|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       |  | OPERA QSAR | 3.35915     | days                    |       |
| Boiling point                                                  |  | OPERA QSAR | 350.158     | degree C                |       |
| Boiling point                                                  |  | TEST QSAR  | 366.386     | degree C                |       |
| Vapor pressure                                                 |  | OPERA QSAR | 0.000000409 | mmHg                    |       |
| Vapor pressure                                                 |  | TEST QSAR  | 7.08E-08    | mmHg                    |       |
| Solubility in water                                            |  | OPERA QSAR | 0.000222763 | mol/L                   |       |
| Solubility in water                                            |  | TEST QSAR  | 0.000192309 | mol/L                   |       |
| Bioconcentration factor                                        |  | OPERA QSAR | 45.858      | no units                |       |
| Bioconcentration factor                                        |  | TEST QSAR  | 102.094     | no units                |       |
| Henry's Law constant                                           |  | OPERA QSAR | 0.00000378  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    |  | OPERA QSAR | 3.54562     | no units                |       |

**Propiconazole**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> .                                                               |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                                                                                 |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985.                                                                                                                                  |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                                                                                            |
| 425              | USEPA. 2019. Propiconazole Human Health Risk Assessment for the New Use of Propiconazole on Avocado, along with Conversion to Brassica, leafy greens, subgroup 4-16B, except watercress, Leaf petiole vegetable subgroup 22B, Celtuce, Florence fennel, Swiss chard, and the expansion to Vegetable, root, except sugar beet, subgroup 1B. EPA-HQ-OPP-2018-0127-0007. DP No. D446376. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C. |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                                                                                           |

**Propoxur**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                                                                      |
|-----------------|----------------------------------------------------------------------------------------------------------------------|
| Name:           | Propoxur                                                                                                             |
| CASRN:          | 114-26-1                                                                                                             |
| DTXSID:         | <a href="#">DTXSID7021948</a>                                                                                        |
| Use:            | Insecticide used on cane, cocoa, fruit grapes, maize, rice, sugar, vegetables, cotton, lucerne, and ornamentals, etc |
| Chemical Notes: |                                                                                                                      |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              | X |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.02                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 7       | reproductive and developmental effects | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                        | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.5                    | red blood cell acetylcholinesterase inhibition in pups | bottle-fed infants | OPP               | 2015                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.01                         | 90th Percentile                               | All Ambient Water                    | NWIS   | 2008-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Propoxur

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value   | Units          | Assessment Source | Critical Study         | Critical Effect                                                                                             | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|---------|----------------|-------------------|------------------------|-------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.00038 | mg/kg/day      | OPP 2015          | Toot 2012a and b       | red blood cell acetylcholinesterase inhibition in pups                                                      | bottle-fed infants | 151                         | 0.503      | [354]                    |       |
| Cancer Slope Factor (CSF)          | 0.00352 | (mg/kg/day)^-1 | OPP 2015          | Suberg and Loeser 1984 | urinary bladder papillomas and carcinomas, borderline significant increased incidence of uterine carcinomas | general population | 33.8                        | 8.41       | [354]                    |       |
| Cancer Classification (CC)         | B2      |                | OPP 2015          |                        |                                                                                                             |                    |                             |            | [354]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units | Source         | Notes |
|---------------------------------------------|-------|-------|----------------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |                |       |
| 10-day Health Advisory                      | 0.04  | mg/L  | EPA DWSHA 2018 |       |
| Lifetime Health Advisory                    | 0.003 | mg/L  | EPA DWSHA 2018 |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 23.5      | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 800       | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 472.39999 | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 9         | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 150.4     | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 3         | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 2.68      | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0009886 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.614     | no units | TEST QSAR |       |
| Developmental toxin test | 0.684     | no units | TEST QSAR |       |

### Nationally Representative Water Data

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  | 0                         |      | Toxic Release Inventory (TRI) Program (EPA) (2016) | 1                | 0.57                       | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

## Non-Nationally Representative Water Data

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| ExpoCast exposure                                  |      | 7.16E-08                                      |       |

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|-------------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 4.65857    | days                    |       |
| Boiling point                                                     | OPERA QSAR | 284.046    | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 285.351    | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.00000821 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.0000306  | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.00570894 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.00252348 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 6.97685    | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 4.9545     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 1.38E-09   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 1.70194    | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 102              | <a href="https://webapps.usgs.gov/rsqa/#!/region/SESQA">https://webapps.usgs.gov/rsqa/#!/region/SESQA</a>                                                                                                                                                                                                                                                                                                                          |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 354              | USEPA. 2015. Propoxur: Human Health Draft Risk Assessment for Registration Review. EPA-HQ-OPP-2009-0806-0023. DP No. D414135. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                           |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |



**Prosulfuron**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Prosulfuron                   |
| CASRN:          | 94125-34-5                    |
| DTXSID:         | <a href="#">DTXSID9034868</a> |
| Use:            | Post-emergent herbicide       |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.00011                    |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 4       | non-cancer effects | 6          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                      | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 300                    | decreased feed efficiency, hematological findings and hepatotoxicity | general population | OPP               | 2015                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.03224                      | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Prosulfuron

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study        | Critical Effect                                                      | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|-----------------------|----------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.053 | mg/kg/day | OPP 2015          | Chow and Richter 1992 | decreased feed efficiency, hematological findings and hepatotoxicity | general population | 33.8                        | 314        | [355]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2015          |                       |                                                                      |                    |                             |            | [355]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 0.7   | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.1   | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.34  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.34  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.053 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 546       | mg/kg     | NIH HSDB                        |       |
| LOAEL                                            | 18.6      | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 508       | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 1.95      | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 200       | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 2.29      | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 31        | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 69.300003 | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 2.88      | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 6.5       | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0170608 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   |           |          | TEST QSAR |       |
| Developmental toxin test | 1.087     | no units | TEST QSAR |       |

## Prosulfuron

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,760                               | 16                   | Sites                 | 0.91                    | 7.00E - 04                 | 0.00635                   | 0.0322                       | 0.274                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 322                                 | 13                   | Sites                 | 4.04                    | 7.00E - 04                 | 0.0062                    | 0.0222                       | 0.173                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,438                               | 3                    | Sites                 | 0.21                    | 0.0018                     | 0.0065                    | 0.194                        | 0.274                      | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 29               | 25,349                       | 2016 | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                               | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|------------------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                                  |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                           | 2001 - 2013 | 8                                   | 1                    | Sites                  | 12                      | 0.0025                     | 0.0025                    | 0.0025                       | 0.0025                     | ug/L        |       |
| <b>Ambient Water</b>                                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water)          | 2008 - 2017 | 306                                 | 4                    | Sites                  | 1.31                    | 0.0055                     | 0.114                     | 0.192                        | 0.197                      | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)            | 2008 - 2017 | 528                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (All Water)              | 2008 - 2017 | 834                                 | 4                    | Sites                  | 0.48                    | 0.0055                     | 0.114                     | 0.192                        | 0.197                      | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated) | 2001 - 2013 | 121                                 | 1                    | Sites                  | 0.83                    | 0.0025                     | 0.0025                    | 0.0025                       | 0.0025                     | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                        | 2001 - 2013 | 113                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                          | 2001 - 2013 | 8                                   | 1                    | Sites                  | 12                      | 0.0025                     | 0.0025                    | 0.0025                       | 0.0025                     | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                      | 2012 - 2013 | 584                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                            |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Estimated Concentration in Water</b>                                | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg-<br>bw/day) | Notes |
|----------------------------------------------------|------|------------------------------------------------|-------|
| ExpoCast exposure                                  |      | 0.000000157                                    |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) | < LOD                           | ug/l  |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 4.63586     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 264.577     | degree C                |       |
| Boiling point                                                     | TEST QSAR  |             |                         |       |
| Vapor pressure                                                    | OPERA QSAR | 3.93E-11    | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 5.45E-11    | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0000576   | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000104472 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 2.58961     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 1.15345     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 2.63E-11    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 2.02925     | no units                |       |

**Prosulfuron**

CCL 5 Contaminant Information Sheet

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 355              | USEPA. 2015. Prosulfuron. Draft Human Health Risk Assessment in Support of Registration Review. EPA-HQ-OPP-2011-1010-0019. DP No. D426092. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                              |

**Pymetrozine**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                        |                                                                                                                                                               |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Name:</b>           | Pymetrozine                                                                                                                                                   |
| <b>CASRN:</b>          | 123312-89-0                                                                                                                                                   |
| <b>DTXSID:</b>         | <a href="#">DTXSID2032637</a>                                                                                                                                 |
| <b>Use:</b>            | Pesticide used to control aphids and whiteflies in vegetables, ornamentals, cotton, field crops, deciduous and citrus fruit; control of plant hoppers in rice |
| <b>Chemical Notes:</b> |                                                                                                                                                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                                 |                                   |
|---------------------------------|-----------------------------------|
| <b>Draft CCL5 List Decision</b> | <b>Final Hazard Quotient (HQ)</b> |
| Not List                        | 0.0069                            |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 4       | carcinogen with linear MOA | 3          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                           | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 2                      | liver benign hepatoma and hepatocarcinoma | general population | OPP               | 2017                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.01384                      | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                          |
|--------------------------|
| <b>Public Nomination</b> |
|                          |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Pymetrozine

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units                     | Assessment Source | Critical Study | Critical Effect                           | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|---------------------------|-------------------|----------------|-------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.008  | mg/kg/day                 | OPP 2017          | Pinto 2003     | morphometric changes in brains of pups    | bottle-fed infants | 151                         | 10.6       | [392]                    |       |
| Cancer Slope Factor (CSF)          | 0.0119 | (mg/kg/day) <sup>-1</sup> | OPP 2017          | Gerspach 1995  | liver benign hepatoma and hepatocarcinoma | general population | 33.8                        | 2.49       | [392]                    |       |
| Cancer Classification (CC)         | L      |                           | OPP 2017          |                |                                           |                    |                             |            | [392]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value   | Units                     | Source                                  | Notes |
|---------------------------------------------|---------|---------------------------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |         |                           |                                         |       |
| Acute Human Health Benchmark                | 0.05    | mg/L                      | EPA HHBP                                |       |
| Acute PAD                                   | 0.008   | mg/kg/day                 | EPA HHBP                                |       |
| Cancer Slope Factor (CSF)                   | 0.0119  | (mg/kg/day) <sup>-1</sup> | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.05    | mg/L                      | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.00269 | mg/L                      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.05    | mg/L                      | Health-based screening levels from USGS |       |
| Health-Based Screening Level                | 0.00269 | mg/L                      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.008   | mg/kg/day                 | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 5693  | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 5955  | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 3.76  | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 300   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 0.454 | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 100   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 1.26  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 14    | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 360   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 3.12  | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 34.5  | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0028445 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.37      | no units | TEST QSAR |       |
| Developmental toxin test | 0.66      | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
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EPA - Office of Water

Pymetrozine  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                                |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                                |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 844                                 | 2                    | Sites                 | 0.24                    | 0.0032                     | 0.00985                   | 0.0138                       | 0.0165                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 276                                 | 1                    | Sites                 | 0.36                    | 0.0032                     | 0.0032                    | 0.0032                       | 0.0032                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 568                                 | 1                    | Sites                 | 0.18                    | 0.0165                     | 0.0165                    | 0.0165                       | 0.0165                     | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 21               | 21,675                       | 2016 | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 88                                  | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 28                                  | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 116                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 3                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 584                                 | 1                    | Sites                  | 0.17                    | 0.0165                     | 0.0165                    | 0.0165                       | 0.0165                     | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Estimated Concentration in Water</b>                                                | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expcast exposure                                   |      | 1.15E-08                                      |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.35411     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 258.726     | degree C                |       |
| Boiling point                                                     | TEST QSAR  |             |                         |       |
| Vapor pressure                                                    | OPERA QSAR | 0.0000821   | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.00000504  | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.00388089  | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.00295801  | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 2.35119     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  |             |                         |       |
| Henry's Law constant                                              | OPERA QSAR | 0.000000712 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 1.0895      | no units                |       |

**Pymetrozine**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 392              | USEPA. 2017. Pymetrozine. Draft Human Health Risk Assessment for Registration Review. EPA-HQ-OPP-2013-0368-0017. DP No. D439601. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                        |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                    |



## Pyraclostrobin

CCL 5 Contaminant Information Sheet

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Pyraclostrobin                |
| CASRN:          | 175013-18-0                   |
| DTXSID:         | <a href="#">DTXSID7032638</a> |
| Use:            | Very broad spectrum fungicide |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.000041                   |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 9          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                                                                                         | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 200                    | decreased body weight, kidney tubular casts and atrophy in both sexes; increased incidence of liver necrosis and erosion/ulceration of the glandular- stomach and fore-stomach in males | general population | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.00825                      | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
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**Pyraclostrobin**

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**HEALTH EFFECTS DATA**

**Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units     | Assessment Source | Critical Study      | Critical Effect                                                                                                                                                                         | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.034 | mg/kg/day | OPP 2018          | Mellert et al. 1999 | decreased body weight, kidney tubular casts and atrophy in both sexes; increased incidence of liver necrosis and erosion/ulceration of the glandular- stomach and fore-stomach in males | general population | 33.8                        | 201        | [406]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2018          |                     |                                                                                                                                                                                         |                    |                             |            | [406]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                      | Value | Units     | Source                                  | Notes |
|---------------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |       |           |                                         |       |
| Acute Health-Based Guidance Value                 | 0.1   | mg/L      | MN DOH                                  |       |
| Acute Health-Based Guidance Value                 | 0.3   | mg/L      | MN DOH                                  |       |
| Acute Human Health Benchmark                      | 1     | mg/L      | EPA HHBP                                |       |
| Acute PAD                                         | 0.05  | mg/kg/day | EPA HHBP                                |       |
| Chronic Health-Based Guidance Value               | 0.1   | mg/L      | MN DOH                                  |       |
| Chronic Human Health Benchmark                    | 0.22  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                      | 0.22  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)                    | 0.034 | mg/kg/day | EPA HHBP                                |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.1   | mg/L      | MN DOH                                  |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 5000      | mg/kg     | NIH HSDB                        |       |
| LOAEL                                            | 50        | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 9.1999998 | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 25        | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 4.7       | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 28.72     | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 10.8      | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 34.700001 | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 12.9      | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 5.4       | mg/kg/day | EPA Toxicity Reference Database | min   |

| Data Element             | Value | Units    | Source    | Notes |
|--------------------------|-------|----------|-----------|-------|
| <b>Modeled Data</b>      |       |          |           |       |
| LD50                     |       |          | TEST QSAR |       |
| Ames mutagenicity test   | 0.587 | no units | TEST QSAR |       |
| Developmental toxin test | 0.41  | no units | TEST QSAR |       |

## Pyraclostrobin

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                                |             | Prevalence                          |                      |                       |                         | Magnitude                  |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                                |             | Prevalence                          |                      |                       |                         | Magnitude                  |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,763                               | 138                  | Sites                 | 7.83                    | 0.00011                    | 0.00182                   | 0.00825                      | 0.389                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 324                                 | 136                  | Sites                 | 42                      | 0.00011                    | 0.00182                   | 0.00807                      | 0.389                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,439                               | 2                    | Sites                 | 0.14                    | 0.00021                    | 0.123                     | 0.196                        | 0.245                      | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 48               | 2,471,066                    | 2016 | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             | Prevalence                          |                      |                        |                         | Magnitude                  |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 434                                 | 52                   | Sites                  | 12                      | 0.00025                    | 0.00339                   | 0.0782                       | 3.33                       | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 531                                 | 1                    | Sites                  | 0.19                    | 0.00441                    | 0.00441                   | 0.00441                      | 0.00441                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 965                                 | 53                   | Sites                  | 5.49                    | 0.00025                    | 0.00341                   | 0.0774                       | 3.33                       | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 244                                 | 50                   | Sites                  | 20                      | 0.02                       | 0.096                     | 0.245                        | 1.37                       | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                                  | 1                    | Sites                  | 2.63                    | 0.0383                     | 0.0383                    | 0.0383                       | 0.0383                     | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 584                                 | 1                    | Sites                  | 0.17                    | 2e-04                      | 2e-04                     | 2e-04                        | 2e-04                      | ug/L        |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                       | <b>Value</b>         | <b>Units</b>           | <b>Model</b>            | <b>Notes</b>               |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expcast exposure                                   |      | 2.01E-08                                      |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 4.89847     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 336.014     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 465.144     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 8.44E-09    | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 1.5E-09     | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0000103   | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0000209   | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 174.72      | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  |             |                         |       |
| Henry's Law constant                                              | OPERA QSAR | 0.000000108 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 4.00245     | no units                |       |

**Pyraclostrobin**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> .                                                                                                                                                                 |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. Environmental science & technology, 51(9), 4792-4802.                                                                                                                                                                                                                                                                                                               |
| 406              | USEPA. 2018. Pyraclostrobin. Human Health Risk Assessment for a Petition for the Establishment of Use on Greenhouse-Grown Leafy Greens, Except Head Lettuce, Subgroup 4- 16A; Cucurbit Vegetables, Group 9; and Fruiting Vegetables, Group 8-10 and Crop Group Conversions and Expansion of Tolerances for Brassica, Leafy Greens, Subgroup 4-16B; Celtuce; Florence Fennel; Kohlrabi; Leaf Petiole Vegetables, Subgroup 22B; Tropical and Subtropical, Medium to Large Fruit, Inedible Peel, Subgroup 23B; and Brassica Head and Stem, Group 5-16 and a Revised Tolerance Level for Leafy Greens, |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                                                                                                                                                                                    |

**Pyrene**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                          |
|-----------------|------------------------------------------|
| Name:           | Pyrene                                   |
| CASRN:          | 129-00-0                                 |
| DTXSID:         | <a href="#">DTXSID3024289</a>            |
| Use:            | Occurs as a result of incomplete burning |
| Chemical Notes: |                                          |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.00046                    |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 9          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                 | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 100                    | nephropathy (renal tubular pathology, decreased kidney weights) | general population | OW                | 1991                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.046                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Pyrene

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                                                 | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|-----------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.03  | mg/kg/day | IRIS 1990         | USEPA 1989     | renal tubular pathology, decreased kidney weights               | general population | 33.8                        | 178        | [209]                    |       |
| Reference Dose (RfD) or Equivalent | 0.025 | mg/kg/day | OW 1991           | USEPA 1989     | nephropathy (renal tubular pathology, decreased kidney weights) | general population | 33.8                        | 148        | [212]                    |       |
| Cancer Classification (CC)         | NL    |           | PPRTV 2007        |                |                                                                 |                    |                             |            | [282]                    |       |
| Cancer Classification (CC)         | D     |           | IRIS 1990         |                |                                                                 |                    |                             |            | [209]                    |       |
| Cancer Classification (CC)         | D     |           | OW 1991           |                |                                                                 |                    |                             |            | [212]                    |       |
|                                    |       |           | ATSDR 1995        |                |                                                                 |                    |                             |            | [10]                     |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Reproductive                | 0.0075                      | Paltaviciene, 2006 | Reproductive                 | 0.00075                      | Paltaviciene, 2006  | 2006-09-01           | 2020-03-25         | 6765                                           | 2                                               | 16                                             | 1                                                 |

## Other Health Data

| Data Element                                      | Value | Units     | Source                            | Notes |
|---------------------------------------------------|-------|-----------|-----------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |       |           |                                   |       |
| Cancer Classification (CC)                        | 3     | no units  | WHO IARC                          |       |
| Chronic Health-Based Guidance Value               | 0.05  | mg/L      | MN DOH                            |       |
| Chronic Health-Based Guidance Value               | 0.2   | mg/L      | MN DOH                            |       |
| Human Health Ambient Water Quality Criteria       | 0.02  | mg/L      | EPA Human Health Criteria for CWA |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.09  | mg/L      | MN DOH                            |       |
| Subchronic Provisional RfD                        | 0.3   | mg/kg/day | EPA PPRTV                         |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 2700  | mg/kg   | NIH HSDB                |       |
| Percent of active toxcast in vitro assays tested | 6.19  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0070469 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.842     | no units | TEST QSAR |       |
| Developmental toxin test | 0.342     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Pyrene  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

July 2021

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects         | PWS/Sites/<br>Samples | Percent with<br>Detects                               | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects)  | Maximum Conc.<br>(Detects)                            | Conc. Units | Notes                        |
|----------------------------------------------------------------|-------------|-------------------------------------|------------------------------|-----------------------|-------------------------------------------------------|----------------------------|---------------------------|-------------------------------|-------------------------------------------------------|-------------|------------------------------|
| <b>Finished Water</b>                                          |             |                                     |                              |                       |                                                       |                            |                           |                               |                                                       |             |                              |
|                                                                |             | Prevalence                          |                              |                       |                                                       | Magnitude                  |                           |                               |                                                       |             |                              |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                              |                       |                                                       |                            |                           |                               |                                                       |             |                              |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                              |                       |                                                       |                            |                           |                               |                                                       |             |                              |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                              |                       |                                                       |                            |                           |                               |                                                       |             |                              |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                              |                       |                                                       |                            |                           |                               |                                                       |             |                              |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                              |                       |                                                       |                            |                           |                               |                                                       |             |                              |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                              |                       |                                                       |                            |                           |                               |                                                       |             |                              |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                              |                       |                                                       |                            |                           |                               |                                                       |             |                              |
| <b>Ambient Water</b>                                           |             |                                     |                              |                       |                                                       |                            |                           |                               |                                                       |             |                              |
|                                                                |             | Prevalence                          |                              |                       |                                                       | Magnitude                  |                           |                               |                                                       |             |                              |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 588                                 | 38                           | Sites                 | 6.46                                                  | 0.003                      | 0.01                      | 0.046                         | 0.14                                                  | ug/L        |                              |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 101                                 | 30                           | Sites                 | 30                                                    | 0.003                      | 0.01                      | 0.0475                        | 0.14                                                  | ug/L        |                              |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 487                                 | 8                            | Sites                 | 1.64                                                  | 0.004                      | 0.009                     | 0.0388                        | 0.046                                                 | ug/L        |                              |
| Pesticide Application Data                                     |             | Number of States                    | Amount Applied<br>(lbs/year) | Date                  | Toxic Release Data                                    |                            | Number of<br>States       | Amount Released<br>(lbs/year) | Chemical Production Data                              |             | Production Volume (lbs/year) |
| Estimated Annual Agricultural Pesticide Use (USGS)             |             |                                     |                              |                       | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                            |                           |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |             | 100K - 500K                  |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             | Prevalence                          |                      |                        |                         | Magnitude                  |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 28                                  | 1                    | Sites                  | 3.57                    | 0.001                      | 0.001                     | 0.001                        | 0.001                      | ug/L        |       |
| Drinking Water Monitoring Data - WA (Finished)                | 2006 - 2011 | 481                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                                  | NA                   | Sites                  | 0                       |                            |                           |                              |                            | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             | Prevalence                          |                      |                        |                         | Magnitude                  |                           |                              |                            |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 231                                 | 8                    | Sites                  | 3.46                    | 0.1                        | 0.16                      | 0.28                         | 0.3                        | ug/L        |       |
| Drinking Water Monitoring Data - WA (Source)                  | 2006 - 2011 | 634                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 867                                 | 275                  | Sites                  | 32                      | 0.002                      | 0.03                      | 0.37                         | 25.6                       | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 1,095                               | 71                   | Sites                  | 6.48                    | 0.001                      | 0.0155                    | 0.072                        | 1.28                       | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,962                               | 346                  | Sites                  | 18                      | 0.001                      | 0.0295                    | 0.34                         | 25.6                       | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                                  | NA                   | Sites                  | 0                       |                            |                           |                              |                            | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                                  | 14                   | Sites                  | 37                      | 0.0034                     | 0.0092                    | 0.0242                       | 0.0447                     | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             | Prevalence                          |                      |                        |                         | Magnitude                  |                           |                              |                            |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                                  | 5                    | Sites                  | 24                      |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water                              | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg-<br>bw/day) | Notes |
|----------------------------------------------------|------|------------------------------------------------|-------|
| ExpoCast exposure                                  |      | 0.00000147                                     |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 255.189     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 392.038     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 415.21      | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.00000288  | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 8.69E-08    | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000000659 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000000121 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 2230.1      | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 529.663     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.0000116   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 5.05118     | no units                |       |

**Pyrene**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                          |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10               | ATSDR. 1995. Toxicological Profile for Polycyclic Aromatic Hydrocarbons. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                    |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.        |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922). |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                      |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.        |
| 209              | USEPA. 1990. Chemical Assessment Summary, Pyrene. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, D.C.                                                                                                       |
| 212              | USEPA. 1991. Drinking Water Criteria Document for Polycyclic Aromatic Hydrocarbons (PAHs). U.S. Environmental Protection Agency, Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH.                                                           |
| 282              | USEPA. 2007. Provisional Peer-Reviewed Toxicity Values for Pyrene. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH.                                              |



**Pyridaben**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Pyridaben                     |
| CASRN:          | 96489-71-3                    |
| DTXSID:         | <a href="#">DTXSID5032573</a> |
| Use:            | Insecticide                   |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.0054                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 5       | reproductive and developmental effects | 5          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                        | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 30                     | decreased parental and pup body weight | bottle-fed infants | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.1614                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Pyridaben

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study                    | Critical Effect                        | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|-----------------------------------|----------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.022 | mg/kg/day | OPP 2018          | Tesh et al. 1989; Willoughby 1990 | decreased parental and pup body weight | bottle-fed infants | 151                         | 29.1       | [407]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2018          |                                   |                                        |                    |                             |            | [407]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 2.9   | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.44  | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.03  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.03  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.005 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 1100  | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 383   | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 0.5   | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 30    | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 13    | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 2.41  | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 21.96 | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 13.02 | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic LOAEL                                 | 4     | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 1     | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 4.92  | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0015417 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.255     | no units | TEST QSAR |       |
| Developmental toxin test | 0.152     | no units | TEST QSAR |       |

## Pyridaben

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,761                               | 9                    | Sites                 | 0.51                    | 0.00033                    | 0.00096                   | 0.161                        | 0.219                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 322                                 | 7                    | Sites                 | 2.17                    | 0.00038                    | 0.00096                   | 0.0475                       | 0.155                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,439                               | 2                    | Sites                 | 0.14                    | 0.00033                    | 0.11                      | 0.175                        | 0.219                      | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 11               | 35,107                       | 2016 | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 359                                 | 3                    | Sites                  | 0.84                    | 0.0042                     | 0.195                     | 0.215                        | 0.223                      | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 528                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 887                                 | 3                    | Sites                  | 0.34                    | 0.0042                     | 0.195                     | 0.215                        | 0.223                      | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 99                                  | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 584                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                       | <b>Value</b>         | <b>Units</b>           | <b>Model</b>            | <b>Notes</b>               |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Exposure exposure                                  |      | 0.000000139                                   |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 12.6613     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 364.625     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 421.721     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.00000141  | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 8.67E-08    | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 7.08E-08    | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000000585 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 599.145     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  |             |                         |       |
| Henry's Law constant                                              | OPERA QSAR | 4.99E-08    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 6.11525     | no units                |       |

**Pyridaben**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 407              | USEPA. 2018. Pyridaben. Human Health Draft Risk Assessment in Support of Registration Review. EPA-HQ-OPP-2010-0214-0015. DP No. D440297. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                    |

**Quinoline**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                     |
|-----------------|---------------------------------------------------------------------|
| Name:           | Quinoline                                                           |
| CASRN:          | 91-22-5                                                             |
| DTXSID:         | <a href="#">DTXSID1021798</a>                                       |
| Use:            | Chemical intermediate; pharmaceutical (anti-malarial);<br>flavoring |
| Chemical Notes: |                                                                     |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxicants                              |  |
| PubMed Neurotoxicants                             |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| List                     | 9.3                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 6       | carcinogen with linear MOA | 6          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                   | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.01                   | hepatic hemangioendotheliomas or hemangiosarcomas | general population | IRIS              | 2001                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.09312                      | 90th Percentile                               | Finished Water                       | UCMR4  | 2018-2019 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**Quinoline**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element               | Value | Units          | Assessment Source | Critical Study    | Critical Effect                                   | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|----------------------------|-------|----------------|-------------------|-------------------|---------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Cancer Slope Factor (CSF)  | 3     | (mg/kg/day)^-1 | IRIS 2001         | Hirao et al. 1976 | hepatic hemangioendotheliomas or hemangiosarcomas | general population | 33.8                        | 0.00986    | [244]                    |       |
| Cancer Classification (CC) | B2    |                | IRIS 2001         |                   |                                                   |                    |                             |            | [244]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects                       | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|---------------------------------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Renal, Immune, Hepatic, Carcinogenicity, Systemic | 8.8                         | Matsumoto, 2018    | Hepatic                      | 30                           | Uno, 2015           | 2005-07-01           | 2020-03-16         | 2041                                           | 2                                               | 2                                              | 2                                                 |

**Other Health Data**

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 331   | mg/kg   | NIH HSDB                | min   |
| LD50                                             | 460   | mg/kg   | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 0.89  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0046559 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.888     | no units | TEST QSAR |       |
| Developmental toxin test | 0.468     | no units | TEST QSAR |       |

## Quinoline

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 | 3,675                               | 36                   | Sites                 | 0.98                    | 0.0201                     | 0.0288                    | 0.0931                       | 1.5                        | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) | 9                   | 2,474                         | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data | Date | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|------------------------------------------|------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                    |      |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                          |      |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                          |      |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                     |      |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                          |      |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                          |      |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>              |      |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                          |      |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                          |      |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water         | Date | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                          |      |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expocast exposure                                  |      | 0.00000309                                    |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value     | Units                   | Notes |
|-------------------------------------------------------------------|------------|-----------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 13.3246   | days                    |       |
| Boiling point                                                     | OPERA QSAR | 243.313   | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 239.117   | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.0417085 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.0293765 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0339207 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0323594 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 4.69938   | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 17.1396   | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.0000365 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 2.11472   | no units                |       |

**Quinoline**

CCL 5 Contaminant Information Sheet

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| Reference<br>Number | Full Reference                                                                                                                                                                                       |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 244                 | USEPA. 2001. Chemical Assessment Summary, Quinoline. U.S. Environmental Protection Agency, National Center for Environmental Assessment, Integrated Risk Information System (IRIS), Washington, D.C. |



**Silicon**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Silicon                       |
| CASRN:          | 7440-21-3                     |
| DTXSID:         | <a href="#">DTXSID0051441</a> |
| Use:            | Chemical intermediate; alloys |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 |                            |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity | Prevalence | Magnitude |
|---------|----------|------------|-----------|
|         |          | 10         | 10        |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect | Target Pop. | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------|-------------|-------------------|----------------------|
|                                                          |                        |                 |             |                   |                      |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 42069                        | 90th Percentile                               | Finished Water                       | NIRS   | 1984-1986 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Silicon

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                                               |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
|              |       |       | IOM 2001          |                |                 |                   |                             |                            | [108]                    | NOTE: No health assessments found, "there is no evidence that the silicon that naturally occurs in food and water produces adverse health outcomes" |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                         | Value | Units | Source | Notes |
|--------------------------------------|-------|-------|--------|-------|
| Measured Data and Assessment Results |       |       |        |       |
|                                      |       |       |        |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                         | Value | Units | Source   | Notes |
|--------------------------------------|-------|-------|----------|-------|
| Measured Data and Assessment Results |       |       |          |       |
| LD50                                 | 3160  | mg/kg | NIH HSDB |       |

| Data Element             | Value | Units | Source    | Notes |
|--------------------------|-------|-------|-----------|-------|
| Modeled Data             |       |       |           |       |
| LD50                     |       |       | TEST QSAR |       |
| Ames mutagenicity test   |       |       | TEST QSAR |       |
| Developmental toxin test |       |       | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Silicon  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 | 989                           | 989               | Sites              | 100                  | 260                     | 18139                  | 42069                     | 98916                   | ug/L        |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) | 1B - 5B                      |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                            | NA                | Sites               | 100                  |                         | 2930                   |                           | 22300                   | ug/L        |       |
| Community Water System Survey (CWSS) (Finished) [178]         | 2006        | 1                             | NA                | Sites               |                      |                         | 5280                   | 5280                      |                         | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 49                            | 49                | Sites               | 100                  | 2                       | 2800                   | 5900                      | 61000                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 81                            | 78                | Sites               | 96                   | 8                       | 4600                   | 6190                      | 23000                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 130                           | 127               | Sites               | 98                   | 2                       | 3800                   | 6150                      | 61000                   | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                            | NA                | Sites               | 100                  |                         | 2750                   |                           | 22400                   | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                              | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                   |      |                                         |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

**Silicon**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                  |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. Science of The Total Environment. v581-582, (909-922). |
| 108              | IOM. 2001. Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc. Institute of Medicine (IOM), National Academies of Science, Washington, D.C.                                         |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                           |

**Sitagliptin**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                |
|-----------------|--------------------------------|
| Name:           | Sitagliptin                    |
| CASRN:          | 486460-32-6                    |
| DTXSID:         | <a href="#">DTXSID70197572</a> |
| Use:            | Hypoglycemic agents            |
| Chemical Notes: |                                |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxics                                 |  |
| PubMed Neurotoxics                                |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.028                      |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 7       | non-cancer effects | 8          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                      | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 3                      | lowest therapeutic dose: improved glycemic control for patients with type 2 diabetes | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.08453                      | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Sitagliptin

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value       | Units     | Assessment Source  | Critical Study            | Critical Effect                                                                    | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                 |
|------------------------------------|-------------|-----------|--------------------|---------------------------|------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.000416667 | mg/kg/day | FDA 2018; NIH 2018 | Merck Sharp & Dohme Corp. | lowest therapeutic dose:improve glycemic control for patients with type 2 diabetes | bottle-fed infants | 151                         | 2.80                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 0.000416667 | mg/kg/day | FDA 2018; NIH 2018 | Merck Sharp & Dohme Corp. | lowest therapeutic dose:improve glycemic control for patients with type 2 diabetes | general population | 33.8                        | 9.80                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                            | Value       | Units | Source              | Notes |
|---------------------------------------------------------|-------------|-------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |       |                     |       |
| Screening level for pharmaceutical - general population | 0.009803922 | mg/L  | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.002777778 | mg/L  | EPA Office of Water |       |

| Data Element                                | Value | Units | Source   | Notes |
|---------------------------------------------|-------|-------|----------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |          |       |
| LD50                                        | 3000  | mg/kg | NIH HSDB | min   |
| LD50                                        | 4000  | mg/kg | NIH HSDB | max   |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0016596 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.299     | no units | TEST QSAR |       |
| Developmental toxin test | 0.869     | no units | TEST QSAR |       |

## Sitagliptin

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 557                                 | 12                   | Sites                 | 2.15                    | 0.00365                    | 0.0268                    | 0.0845                       | 0.184                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 75                                  | 12                   | Sites                 | 16                      | 0.00365                    | 0.0268                    | 0.0845                       | 0.184                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 482                                 | 0                    | Sites                 | 0                       |                            |                           |                              |                            |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                                  | NA                   | Sites                  | 0                       |                            |                           |                              |                            | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 205                                 | 41                   | Sites                  | 20                      | 0.00263                    | 0.0333                    | 0.117                        | 0.484                      | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 401                                 | 2                    | Sites                  | 0.5                     | 0.0432                     | 0.219                     | 0.325                        | 0.395                      | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 606                                 | 43                   | Sites                  | 7.1                     | 0.00263                    | 0.0369                    | 0.12                         | 0.484                      | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                                  | NA                   | Sites                  | 0                       |                            |                           |                              |                            | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                                  | 12                   | Sites                  | 32                      | 0.002071                   | 0.00841                   | 0.153                        | 0.2267841                  | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                       | 2013 - 2015 | 1,106                               | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                                  | 20                   | Sites                  | 95                      | 0.0242164                  | 0.261                     | 4.9                          | 5.184601                   | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                       | <b>Value</b>         | <b>Units</b>           | <b>Model</b>            | <b>Notes</b>               |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expcast exposure                                   |      |                                               |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|-------------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.54479    | days                    |       |
| Boiling point                                                     | OPERA QSAR | 328.816    | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 403.649    | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 9.8E-10    | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 2.52E-09   | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.00000549 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.00000646 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 6.6312     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 22.6986    | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 6.26E-11   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 1.82307    | no units                |       |

**Sitagliptin**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                  |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. Environmental Science and Technology 53: 2950-2960.                                                   |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. Environmental science & technology, 51(9), 4792-4802.            |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                  |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. Science of The Total Environment. v581-582, (909-922). |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                             |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. Science of the Total Environment, 636, 69-79.        |



**Sodium**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name:           | Sodium                                                                                                                                                                                                                                                                                                                                                                                                                 |
| CASRN:          | 7440-23-5                                                                                                                                                                                                                                                                                                                                                                                                              |
| DTXSID:         | DTXSID1049774                                                                                                                                                                                                                                                                                                                                                                                                          |
| Use:            | Chemical intermediate; alloys; semiconductors                                                                                                                                                                                                                                                                                                                                                                          |
| Chemical Notes: | EPA requires periodic monitoring of sodium at the entry point to the distribution system. Monitoring is to be conducted annually for surface water systems and every 3 years for groundwater systems (40 CFR:141.41). The water supplier must report sodium test results to local and State public health officials by direct mail within 3 months of the analysis unless this responsibility is assumed by the State. |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 8                          |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
|         | non-cancer effects | 10         | 10        |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                    | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 20000                  | organoleptic effects, risk to adults under strict low-sodium diets | general population | OW                | 2003                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 160240                       | 90th Percentile                               | Finished Water                       | NIRS   | 1984-1986 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1 | RD 2           | RD 3           |
|------|----------------|----------------|
| X    | Not Applicable | Not Applicable |

**Basis**

Sodium generally occurs at low levels in drinking water, and when it occurs at high levels the taste may be expected to cause people to reduce their consumption [a,b]. In addition, drinking water is only a minor source of dietary sodium compared with food, and sodium is only one factor among many that contributes to hypertension and heart disease. Therefore, regulation of sodium in drinking water is unlikely to represent a meaningful opportunity for health risk reduction [a,c]. The most effective means to protect the health of PWS users is to identify groups who are more sensitive than the general population, and provide dietary guidance through the public health community [c].

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Sodium

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                                              | Target Population  | Exposure Factor (mL/kg-day) | HRL (µg/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|--------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 6.25  | mg/kg/day | HC 1992           | WHO 1984       | organoleptic effects, risk to adults under strict low-sodium | general population | 33.8                        | 37000      | [91]                     |       |
| Drinking Water Advisory            | 20    | mg/L      | OW 2003           | USEPA 1996     | organoleptic effects, risk to adults under strict low-sodium | general population | 33.8                        | 20000      | [256]                    |       |
|                                    |       |           | OW 2003           |                |                                                              |                    |                             |            | [256]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value | Units  | Assessment Source | Critical Study                                                   | Critical Effect          | Target Population         | Exposure Factor (mL/kg-day) | CCL Screening Level (µg/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|--------|-------------------|------------------------------------------------------------------|--------------------------|---------------------------|-----------------------------|----------------------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 2300  | mg/day | IOM 2005          | Johnson et al., 2001; MacGregor et al., 1989; Sacks et al., 2001 | increased blood pressure | lactating women           | 2720                        | 169000                     | [110]                    |       |
| Reference Dose (RfD) or Equivalent | 2300  | mg/day | IOM 2005          | Johnson et al., 2001; MacGregor et al., 1989; Sacks et al., 2001 | hypertensive disorders   | pregnant women            | 2642                        | 174000                     | [110]                    |       |
| Reference Dose (RfD) or Equivalent | 2300  | mg/day | IOM 2005          | Johnson et al., 2001; MacGregor et al., 1989; Sacks et al., 2001 | increased blood pressure | general population        | 2413                        | 191000                     | [110]                    |       |
| Reference Dose (RfD) or Equivalent | 2300  | mg/day | IOM 2005          | Johnson et al., 2001; MacGregor et al., 1989; Sacks et al., 2001 | increased blood pressure | women of childbearing age | 2430                        | 189000                     | [110]                    |       |
|                                    |       |        | IOM 2019          |                                                                  |                          |                           |                             |                            | [112]                    |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                         | Value | Units | Source | Notes |
|--------------------------------------|-------|-------|--------|-------|
| Measured Data and Assessment Results |       |       |        |       |
|                                      |       |       |        |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                         | Value | Units | Source | Notes |
|--------------------------------------|-------|-------|--------|-------|
| Measured Data and Assessment Results |       |       |        |       |
|                                      |       |       |        |       |

| Data Element                | Value | Units | Source    | Notes |
|-----------------------------|-------|-------|-----------|-------|
| Modeled Data                |       |       |           |       |
| LD50                        |       |       | TEST QSAR |       |
| Ames mutagenicity           |       |       | TEST QSAR |       |
| Developmental toxicity test |       |       | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Sodium  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 | 989                           | 989               | Sites              | 100                  | 907                     | 16355                  | 160240                    | 1541000                 | ug/L        |       |
| <b>Ambient Water</b>                                           |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 12,093                        | 12,092            | Sites              | 100                  | 70                      | 13300                  | 84600                     | 1.90E+07                | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,592                         | 2,592             | Sites              | 100                  | 70                      | 13100                  | 76600                     | 6.00E+06                | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9,502                         | 9,501             | Sites              | 100                  | 80                      | 14000                  | 107000                    | 1.90E+07                | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) | 50M - 100M                   |

Non-Scoring Data

| Non-Nationally Representative Water Data              | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|-------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                 |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)        | 2006 - 2020 | 589                           | 588               | Sites              | 100                  | 500                     | 50000                  | 103000                    | 3.7e+07                 | ug/L        |       |
| Drinking Water Monitoring Data - DC (Finished)        | 2008 - 2009 | 1                             | 1                 | Sites              | 100                  | 10000                   | 15500                  | 19300                     | 22000                   | ug/L        |       |
| Drinking Water Monitoring Data - MA (Finished)        | 2006 - 2020 | 1,778                         | 1,777             | Sites              | 100                  | 190                     | 23000                  | 88260                     | 5100000                 | ug/L        |       |
| Drinking Water Monitoring Data - WA (Finished)        | 2006 - 2011 | 936                           | 893               | Sites              | 95                   | 710                     | 9800                   | 37240                     | 830000                  | ug/L        |       |
| Glassmeyer et al 2017 (Finished) [86]                 | 2007 - 2012 | 25                            | NA                | Sites              | 100                  |                         | 27800                  |                           | 128000                  | ug/L        |       |
| Community Water System Survey (CWSS) (Finished) [178] | 2006        | 27                            | NA                | Sites              |                      |                         | 19500                  | 83000                     |                         | ug/L        |       |
| <b>Ambient Water</b>                                  |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)          | 2006 - 2020 | 5,409                         | 5,400             | Sites              | 100                  | 400                     | 35000                  | 120000                    | 203500000               | ug/L        |       |
| Drinking Water Monitoring Data - FL (Source)          | 2006 - 2011 | 105                           | 100               | Sites              | 95                   | 7                       | 9165                   | 80860                     | 860000                  | ug/L        |       |
| Drinking Water Monitoring Data - MA (Source)          | 2006 - 2020 | 159                           | 159               | Sites              | 100                  | 2600                    | 49000                  | 196790                    | 4100000                 | ug/L        |       |
| Drinking Water Monitoring Data - PA (Source)          | 2006 - 2011 | 1                             | 1                 | Sites              | 100                  | 18900                   | 18900                  | 18900                     | 18900                   | ug/L        |       |
| Drinking Water Monitoring Data - WA (Source)          | 2006 - 2011 | 1,498                         | 1,303             | Sites              | 87                   | 700                     | 8900                   | 37400                     | 950000                  | ug/L        |       |
| Drinking Water Monitoring Data - WI (Source)          | 2012-2019   | 142                           | 141               | Sites              | 99                   | 450                     | 6500                   | 36000                     | 210000                  | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                  | 2007 - 2012 | 25                            | NA                | Sites              | 100                  |                         | 24000                  |                           | 128000                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                     | 2012 - 2013 | 758                           | 757               | Sites              | 100                  | 450                     | 15800                  | 164000                    | 682000                  | ug/L        |       |
| <b>Waste Water Effluent</b>                           |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
|                                                       |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>               | Date        | Source                        | Value             | Units              | Model                | Notes                   |                        |                           |                         |             |       |
|                                                       |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Exposure exposure                               |      |                                         |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922).                                                                                                                            |
| 91               | HC. 1992. Guideline Technical Document - Sodium. Health Canada (HC), Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Ottawa, Ontario, Canada.                                                                                                                                                                                                                                                       |
| 110              | IOM. 2005. Dietary Reference Intakes for Water, Potassium, Sodium, Chloride, and Sulfate. Institute of Medicine (IOM), National Academy of Science, Washington, D.C.                                                                                                                                                                                                                                                               |
| 112              | IOM. 2019. Dietary Reference Intakes for Sodium and Potassium (2019). Institute of Medicine (IOM), National Academies of Science, Washington, D.C.                                                                                                                                                                                                                                                                                 |
| 152              | NRC. 1989. Recommended Dietary Allowances. Washington, DC: National Academy of Sciences, National Academy Press. pp. 247–261.                                                                                                                                                                                                                                                                                                      |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                                                                                                                                                              |
| 183              | USEPA, 2001. Regulatory Determination Support Document for Sodium. EPA 815 R-01-014.                                                                                                                                                                                                                                                                                                                                               |
| 185              | USEPA. 2003. Drinking Water Advisory: Consumer Acceptability Advice and Health Effects Analysis on Sodium. EPA 822-R-03-006. February 2003.                                                                                                                                                                                                                                                                                        |
| 232              | USEPA. 1999. A Review of Contaminant Occurrence in Public Water Systems. Office of Water. EPA Report 816-R-99-006. 78 pp.                                                                                                                                                                                                                                                                                                          |
| 256              | USEPA. 2003. Drinking Water Advisory: Consumer Acceptability Advice and Health Effects Analysis on Sodium. U.S. Environmental Protection Agency, Office of Water, Health and Ecological Criteria Division, Washington, D.C.                                                                                                                                                                                                        |

**Sulfamethoxazole**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                 |
|-----------------|---------------------------------|
| Name:           | Sulfamethoxazole                |
| CASRN:          | 723-46-6                        |
| DTXSID:         | <a href="#">DTXSID8026064</a>   |
| Use:            | Antibacterial; antipneumocystic |
| Chemical Notes: |                                 |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.0098                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects | 9          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                                                                                                                                 | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 20                     | lowest therapeutic dose: treat or prevent bacterial infections: urinary tract infections/acute otitis media/acute exacerbations of chronic bronchitis/Shigellosis/Pneumocystis jiroveci Pneumonia/Traveler's Diarrhea in Adults | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.1968                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Sulfamethoxazole

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value       | Units     | Assessment Source  | Critical Study                      | Critical Effect                                                                                                                                                                                                                | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                 |
|------------------------------------|-------------|-----------|--------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.003333333 | mg/kg/day | FDA 2018; NIH 2018 | Mutual Pharmaceutical Company, Inc. | lowest therapeutic dose:treat or prevent bacterial infections: urinary tract infections/acute otitis media/acute exacerbations of chronic bronchitis/Shigellosis/Pneumocystis jiroveci Pneumonia/Traveler's Diarrhea in Adults | bottle-fed infants | 151                         | 22.0                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 0.003333333 | mg/kg/day | FDA 2018; NIH 2018 | Mutual Pharmaceutical Company, Inc. | lowest therapeutic dose:treat or prevent bacterial infections: urinary tract infections/acute otitis media/acute exacerbations of chronic bronchitis/Shigellosis/Pneumocystis jiroveci Pneumonia/Traveler's Diarrhea in Adults | general population | 33.8                        | 78.0                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                            | Value       | Units    | Source              | Notes |
|---------------------------------------------------------|-------------|----------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |          |                     |       |
| Acute Health-Based Guidance Value                       | 0.1         | mg/L     | MN DOH              |       |
| Cancer Classification (CC)                              | 3           | no units | WHO IARC            |       |
| Chronic Health-Based Guidance Value                     | 0.1         | mg/L     | MN DOH              |       |
| Screening level for pharmaceutical - general population | 0.078431373 | mg/L     | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.022222222 | mg/L     | EPA Office of Water |       |
| Short-Term/Subchronic Health-Based Guidance Value       | 0.1         | mg/L     | MN DOH              |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 2650  | mg/kg   | NIH HSDB                | min   |
| LD50                                             | 6370  | mg/kg   | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 1.28  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0337287 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | -0.038    | no units | TEST QSAR |       |
| Developmental toxin test | 0.853     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
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EPA - Office of Water

Sulfamethoxazole

CCL 5 Contaminant Information Sheet

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**OCCURRENCE DATA**

**Scoring Data**

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               | <b>Prevalence</b> |                     |                      | <b>Magnitude</b>        |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               | <b>Prevalence</b> |                     |                      | <b>Magnitude</b>        |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 619                           | 30                | Sites               | 4.85                 | 0.0016                  | 0.0408                 | 0.197                     | 1.46                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 75                            | 15                | Sites               | 20                   | 0.0016                  | 0.0527                 | 0.305                     | 1.46                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 544                           | 15                | Sites               | 2.76                 | 0.00483                 | 0.0169                 | 0.0814                    | 0.12                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

**Non-Scoring Data**

| Non-Nationally Representative Water Data                       | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               | <b>Prevalence</b> |                     |                      | <b>Magnitude</b>        |                        |                           |                         |             |       |
| Bradley et al. 2018 (Finished) [53]                            | 2016        | 26                            | 1                 | Sites               | 3.85                 | 0.005                   | 0.005                  | 0.005                     | 0.005                   | ug/L        |       |
| Glassmeyer et al 2017 (Finished) [86]                          | 2007 - 2012 | 25                            | NA                | Sites               | 4                    |                         | 0.0082                 |                           | 0.0082                  | ug/L        |       |
| Community Water System Survey (CWSS) (Finished) [178]          | 2006        | 1                             | NA                | Sites               |                      |                         | 0.002                  | 0.002                     |                         | ug/L        |       |
| Padhye et al. 2013 (Finished) [155]                            | 2009 - 2010 | 8                             | 1                 | Samples             | 12                   | 0                       | 0                      |                           | 1.27e-05 +/- 3.6e-06    | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                  | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Kleywegt et al. (2011) via Uslu et al. (2013) (Finished) [433] | 2011        | NA                            | NA                |                     |                      |                         |                        |                           | 0.002                   | ug/L        |       |
| IL EPA (2008) via Uslu et al. (2013) (Finished) [433]          | 2008        | NA                            | NA                |                     |                      |                         |                        |                           | 0.005                   | ug/L        |       |
|                                                                |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               | <b>Prevalence</b> |                     |                      | <b>Magnitude</b>        |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)  | 2008 - 2017 | 502                           | 179               | Sites               | 36                   | 0.00171                 | 0.029                  | 0.216                     | 1.58                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)    | 2008 - 2017 | 940                           | 73                | Sites               | 7.77                 | 0.00275                 | 0.0245                 | 0.2                       | 0.965                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)      | 2008 - 2017 | 1,441                         | 252               | Sites               | 17                   | 0.00171                 | 0.029                  | 0.202                     | 1.58                    | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                           | 2007 - 2012 | 25                            | NA                | Sites               | 40                   |                         | 0.0501                 |                           | 0.1611                  | ug/L        |       |
| Batt et al. 2016 (Ambient) [46]                                | 2008 - 2009 | 182                           | 141               | Sites               | 77                   | 0.0016                  | 0.0289                 | 0.11                      | 0.5764                  | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                             | 2012 - 2014 | 38                            | 20                | Sites               | 53                   | 0.005                   | 0.115                  | 0.895                     | 1.5                     | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                        | 2013 - 2015 | 1,100                         | 12                | Sites               | 1.09                 | 0.019022                | 0.0338                 | 0.0644                    | 0.1198271               | ug/L        |       |
| Padhye et al. 2013 (Ambient) [155]                             | 2009 - 2010 | 8                             | 7                 | Samples             | 88                   | 0                       | 2.4e-06                |                           | 7.4e-06 +/- 8e-07       | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                   | 2009 - 2010 | 2                             | 2                 | Sites               | 100                  | 0.006                   | 0.022                  | 0.0448                    | 0.052                   | ug/L        |       |
| Kleywegt et al. (2011) via Uslu et al. (2013) (Ambient) [433]  | 2011        | NA                            | NA                |                     |                      |                         |                        |                           | 0.284                   | ug/L        |       |
| Tabe et al. (2009) via Uslu et al. (2013) (Ambient) [433]      | 2009        | NA                            | NA                |                     |                      |                         |                        |                           | 0.002                   | ug/L        |       |
| Kormos et al. (2007) via Uslu et al. (2013) (Ambient) [433]    | 2007        | NA                            | NA                |                     |                      |                         |                        |                           | 0.035                   | ug/L        |       |
| IL EPA (2008) via Uslu et al. (2013) (Ambient) [433]           | 2008        | NA                            | NA                |                     |                      |                         |                        |                           | 0.012                   | ug/L        |       |
| Alvarez et al. (2005) via Kostich et al. 2010 (Ambient) [127]  | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.034                   | ug/L        |       |
| Barnes et al. (2008) via Kostich et al. 2010 (Ambient) [127]   | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 1.11                    | ug/L        |       |
| Batt et al. (2006) via Kostich et al. 2010 (Ambient) [127]     | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.45                    | ug/L        |       |
| Batt et al. (2008) via Kostich et al. 2010 (Ambient) [127]     | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.14                    | ug/L        |       |
| Benotti et al. (2007) via Kostich et al. 2010 (Ambient) [127]  | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.081                   | ug/L        |       |
| Benotti et al. (2009) via Kostich et al. 2010 (Ambient) [127]  | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.11                    | ug/L        |       |
| Brown et al. (2006) via Kostich et al. 2010 (Ambient) [127]    | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.3                     | ug/L        |       |
| Conkle et al. (2008) via Kostich et al. 2010 (Ambient) [127]   | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.369                   | ug/L        |       |
| Conley et al. (2008) via Kostich et al. 2010 (Ambient) [127]   | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.033                   | ug/L        |       |
| Conley et al. (2008b) via Kostich et al. 2010 (Ambient) [127]  | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.01                    | ug/L        |       |
| Focazio et al. (2008) via Kostich et al. 2010 (Ambient) [127]  | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.023                   | ug/L        |       |

| Non-Nationally Representative Water Data                             | Date         | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------|--------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| Glassmeyer et al. (2005) via Kostich et al. 2010 (Ambient) [127]     | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 0.763                      | ug/L        |       |
| Haggard et al. (2006) via Kostich et al. 2010 (Ambient) [127]        | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 0.5                        | ug/L        |       |
| Karthikeyan et al. (2006) via Kostich et al. 2010 (Ambient) [127]    | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 0.08                       | ug/L        |       |
| Kim et al. (2007) via Kostich et al. 2010 (Ambient) [127]            | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 0.32                       | ug/L        |       |
| Kolpin et al. (2002) via Kostich et al. 2010 (Ambient) [127]         | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 1.9                        | ug/L        |       |
| Kolpin et al. (2004) via Kostich et al. 2010 (Ambient) [127]         | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 0.07                       | ug/L        |       |
| Lindsey et al. (2001) via Kostich et al. 2010 (Ambient) [127]        | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 1.02                       | ug/L        |       |
| Shelver et al. (2008) via Kostich et al. 2010 (Ambient) [127]        | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 0.09                       | ug/L        |       |
| Stackelberg et al. (2004) via Kostich et al. 2010 (Ambient) [127]    | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 0.05                       | ug/L        |       |
| Stackelberg et al. (2007) via Kostich et al. 2010 (Ambient) [127]    | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 0.06                       | ug/L        |       |
| Standley et al. (2008) via Kostich et al. 2010 (Ambient) [127]       | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 0.0022                     | ug/L        |       |
| Trenholm et al. (2006) via Kostich et al. 2010 (Ambient) [127]       | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 0.0049                     | ug/L        |       |
| Vanderford et al. (2003) via Kostich et al. 2010 (Ambient) [127]     | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 0.033                      | ug/L        |       |
| Vanderford et al. (2006) via Kostich et al. 2010 (Ambient) [127]     | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 0.672                      | ug/L        |       |
| Yang et al. (2003) via Kostich et al. 2010 (Ambient) [127]           | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 0.16                       | ug/L        |       |
| <b>Waste Water Effluent</b>                                          |              |                                     |                      | <b>Prevalence</b>      |                         |                            |                           | <b>Magnitude</b>             |                            |             |       |
| Scott et al. 2018 (Wastewater) [161]                                 | 2011 - 2017  | 21                                  | 20                   | Sites                  | 95                      | 0.014029                   | 0.474                     | 0.945                        | 2.082509                   | ug/L        |       |
| Kostich et al. 2014 (Wastewater) [126]                               | not reported | 50                                  | 48                   | Sites                  | 96                      | 0.0026                     | 0.447                     | 1.32                         | 2.8725                     | ug/L        |       |
| Batt et al. (2005) via Kostich et al. 2010 (Wastewater) [127]        | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 1.3                        | ug/L        |       |
| Batt et al. (2006) via Kostich et al. 2010 (Wastewater) [127]        | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 6                          | ug/L        |       |
| Batt et al. (2007) via Kostich et al. 2010 (Wastewater) [127]        | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 2.8                        | ug/L        |       |
| Batt et al. (2008) via Kostich et al. 2010 (Wastewater) [127]        | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 2.2                        | ug/L        |       |
| Benotti et al. (2007) via Kostich et al. 2010 (Wastewater) [127]     | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 0.626                      | ug/L        |       |
| Conkle et al. (2008) via Kostich et al. 2010 (Wastewater) [127]      | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 4.09                       | ug/L        |       |
| Glassmeyer et al. (2005) via Kostich et al. 2010 (Wastewater) [127]  | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 0.589                      | ug/L        |       |
| Karthikeyan et al. (2006) via Kostich et al. 2010 (Wastewater) [127] | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 1.25                       | ug/L        |       |
| Renew et al. (2004) via Kostich et al. 2010 (Wastewater) [127]       | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 2.14                       | ug/L        |       |
| Shelver et al. (2008) via Kostich et al. 2010 (Wastewater) [127]     | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 3.1                        | ug/L        |       |
| Spongberg et al. (2008) via Kostich et al. 2010 (Wastewater) [127]   | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 0.472                      | ug/L        |       |
| Trenholm et al. (2006) via Kostich et al. 2010 (Wastewater) [127]    | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 0.36                       | ug/L        |       |
| Vanderford et al. (2006) via Kostich et al. 2010 (Wastewater) [127]  | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 2.06                       | ug/L        |       |
| Yang et al. (2003) via Kostich et al. 2010 (Wastewater) [127]        | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 0.52                       | ug/L        |       |
| <b>Estimated Concentration in Water</b>                              | <b>Date</b>  | <b>Source</b>                       | <b>Value</b>         | <b>Units</b>           | <b>Model</b>            | <b>Notes</b>               |                           |                              |                            |             |       |
|                                                                      |              |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg-<br>bw/day) | Notes |
|----------------------------------------------------|------|------------------------------------------------|-------|
| ExpoCast exposure                                  |      | 2.48E-08                                       |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.34495     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 290.681     | degree C                |       |
| Boiling point                                                     | TEST QSAR  |             |                         |       |
| Vapor pressure                                                    | OPERA QSAR | 6.8E-10     | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 4.63E-09    | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000989291 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.00126183  | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 2.73669     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 17.1002     | no units                |       |
| Henry's law constant                                              | OPERA QSAR | 7.84E-11    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 0.948532    | no units                |       |



**Sulfamethoxazole**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                  |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 46               | Batt, A. L., Kincaid, T. M., Kostich, M. S., Lazorchak, J. M., & Olsen, A. R. (2016). Evaluating the extent of pharmaceuticals in surface waters of the United States using a National-scale Rivers and Streams Assessment survey. <i>Environmental toxicology and chemistry</i> , 35(4), 874-881.                                                              |
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. <i>Environmental Science and Technology</i> 53: 2950-2960.                                                                                                            |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                |
| 53               | Bradley, P. M., Kolpin, D. W., Romanok, K. M., Smalling, K. L., Focazio, M. J., Brown, J. B., ... & Dietze, J. E. (2018). Reconnaissance of mixed organic and inorganic chemicals in private and public supply tapwaters at selected residential and workplace sites in the United States. <i>Environmental science &amp; technology</i> , 52(23), 13972-13985. |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                                                                                  |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922).                                                         |
| 126              | Kostich MS, et al. 2014 Concentrations of prioritized pharmaceuticals in effluents from 50 large wastewater treatment plants in the US and implications for risk estimation. <i>Environ Pollut</i> . 2014 Jan;184:354-9. doi: 10.1016/j.envpol.2013.09.013. Epub 2013 Oct 3. PMID: 24095705.                                                                    |
| 127              | Kostich, MS, et al., 2010. Predicting variability of aquatic concentrations of human pharmaceuticals. <i>Sci. Total Environ</i> . 408 (20), 4504e4510.                                                                                                                                                                                                          |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                                                                                             |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                              |
| 155              | Padhye, L.P., Yao, H., Kung'u, F.T., and Huang, C.H. Year-long evaluation on the occurrence and fate of pharmaceuticals, personal care products, and endocrine disrupting chemicals in an urban drinking water treatment plant. 2014. <i>Water Research</i> 51 (2014) 266-276.                                                                                  |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                                                                |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                                                                                           |
| 433              | Uslu, M., Jasim, S., Arvai, A., Bewtra, J. and Biswas, N., 2013. A Survey of Occurrence and Risk Assessment of Pharmaceutical Substances in the Great Lakes Basin. <i>Ozone: Science &amp; Engineering</i> , 35(4), pp.249-262.                                                                                                                                 |

**Sulfentrazone**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Sulfentrazone                 |
| CASRN:          | 122836-35-5                   |
| DTXSID:         | <a href="#">DTXSID6032645</a> |
| Use:            | Herbicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.0009                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity          | Prevalence | Magnitude |
|---------|-------------------|------------|-----------|
| 4       | reduced longevity | 10         | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                                                                                                    | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 200                    | reduced prenatal viability (fetal and litter), reduced litter size, increased number of stillborn pups, reduced pup and litter postnatal survival, decreased pup body weights throughout lactation | bottle-fed infants | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.1793                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |
| Not Applicable |                |                |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Sulfentrazone

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                                                                                                                                                                                    | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.14  | mg/kg/day | OPP 2018          | Ponnock 1994   | reduced prenatal viability (fetal and litter), reduced litter size, increased number of stillborn pups, reduced pup and litter postnatal survival, decreased pup body weights throughout lactation | bottle-fed infants | 151                         | 185        | [409]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2018          |                |                                                                                                                                                                                                    |                    |                             |            | [409]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 3.9   | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.14  | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.9   | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.9   | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.14  | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 2855  | mg/kg     | NIH HSDB                        |       |
| LOAEL                                            | 25    | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 250   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 10    | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 116.9 | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 2.79  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 108.4 | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic LOAEL                                 | 57    | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 23.1  | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 79.8  | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0012274 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.709     | no units | TEST QSAR |       |
| Developmental toxin test | 1.271     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

**Sulfentrazone**

CCL 5 Contaminant Information Sheet

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**OCCURRENCE DATA**

**Scoring Data**

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,762                               | 230                  | Sites                 | 13                      | 0.00055                    | 0.0224                    | 0.179                        | 4.1                        | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 322                                 | 198                  | Sites                 | 61                      | 0.00055                    | 0.0224                    | 0.178                        | 4.1                        | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,440                               | 32                   | Sites                 | 2.22                    | 0.0015                     | 0.0166                    | 0.201                        | 0.26                       | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 39               | 4,031,687                    | 2016 | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

**Non-Scoring Data**

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 307                                 | 72                   | Sites                  | 23                      | 0.00133                    | 0.0226                    | 0.25                         | 2.42                       | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 530                                 | 15                   | Sites                  | 2.83                    | 0.00548                    | 0.0158                    | 0.0304                       | 0.0594                     | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 837                                 | 87                   | Sites                  | 10                      | 0.00133                    | 0.0215                    | 0.244                        | 2.42                       | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                             | 2012 - 2013 | 584                                 | 6                    | Sites                  | 1.03                    | 0.0015                     | 0.007                     | 0.109                        | 0.199                      | ug/L        |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                       | <b>Value</b>         | <b>Units</b>           | <b>Model</b>            | <b>Notes</b>               |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expocast exposure                                  |      | 0.000000118                                   |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 4.65135     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 342.454     | degree C                |       |
| Boiling point                                                     | TEST QSAR  |             |                         |       |
| Vapor pressure                                                    | OPERA QSAR | 7.86E-10    | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 2.59E-08    | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0001917   | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000125314 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 7.66859     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 6.91831     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 8.59E-11    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 1.3198      | no units                |       |

**Sulfentrazone**

CCL 5 Contaminant Information Sheet

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> .                                                                     |
| 409              | USEPA. 2018. Sulfentrazone - Human Health Risk Assessment for a Section 3 Registration Request to Add New Uses on Chia and Teff; an Amended Use on Mint; and Crop Group Conversions for Tree Nut Group 14-12, Stalk and Stem Vegetable Subgroup 22A; Vegetable, Brassica, Head and Stem, Group 5-16; and Brassica, Leafy Greens, Subgroup 4-16B. EPA-HQ-OPP-2017-0072-0009. DP No. D443993. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C. |

**Sulfometuron methyl**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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**CONTAMINANT IDENTIFYING INFORMATION**

|                        |                                                                                  |
|------------------------|----------------------------------------------------------------------------------|
| <b>Name:</b>           | Sulfometuron methyl                                                              |
| <b>CASRN:</b>          | 74222-97-2                                                                       |
| <b>DTXSID:</b>         | <a href="#">DTXSID0034936</a>                                                    |
| <b>Use:</b>            | Herbicide for annual, biennial, and perennial grasses and annual broadleaf weeds |
| <b>Chemical Notes:</b> |                                                                                  |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                                 |                                   |
|---------------------------------|-----------------------------------|
| <b>Draft CCL5 List Decision</b> | <b>Final Hazard Quotient (HQ)</b> |
| Not List                        | 0.000018                          |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 4       | non-cancer effects | 9          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 2000                   | decreased body weight gain, hemolytic anemia, increase in alkaline phosphatase | general population | OPP               | 2015                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.03624                      | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                          |
|--------------------------|
| <b>Public Nomination</b> |
|                          |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Sulfometuron methyl

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study       | Critical Effect                                                                                                                                                     | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.275 | mg/kg/day | OPP 2015          | Wood and O'Neal 1983 | decreased body weight gain, hemolytic anemia, increase in alkaline phosphatase -- decreased body weight gain seen at beginning of 4 weeks of exposure in adult dogs | general population | 33.8                        | 1630       | [357]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2015          |                      |                                                                                                                                                                     |                    |                             |            | [357]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 1.83  | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.275 | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 1.76  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 1.76  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.275 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 5000  | mg/kg   | NIH HSDB                |       |
| Percent of active toxcast in vitro assays tested | 0.75  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value | Units    | Source    | Notes |
|--------------------------|-------|----------|-----------|-------|
| <b>Modeled Data</b>      |       |          |           |       |
| LD50                     |       |          | TEST QSAR |       |
| Ames mutagenicity test   | 0.116 | no units | TEST QSAR |       |
| Developmental toxin test | 1.056 | no units | TEST QSAR |       |

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Draft Fifth Contaminant Candidate List (CCL 5)  
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EPA 815-R-21-006  
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Sulfometuron methyl  
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OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 4,167                         | 261               | Sites              | 6.26                 | 9.00E - 05              | 0.00454                | 0.0362                    | 3.51                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 471                           | 228               | Sites              | 48                   | 2.00E - 04              | 0.00455                | 0.0363                    | 3.51                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 3,696                         | 33                | Sites              | 0.89                 | 9.00E - 05              | 0.004                  | 0.0336                    | 0.284                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 12                            | 7                 | Sites               | 58                   | 0.00127                 | 0.0032                 | 0.012                     | 0.025                   | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 475                           | 119               | Sites               | 25                   | 2.00E - 04              | 0.00645                | 0.0348                    | 1.79                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 1,057                         | 16                | Sites               | 1.51                 | 0.00137                 | 0.0055                 | 0.0474                    | 0.101                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 1,532                         | 135               | Sites               | 8.81                 | 2.00E - 04              | 0.00645                | 0.0352                    | 1.79                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 9                 | Sites               | 3.93                 | 0.00127                 | 0.0038                 | 0.0192                    | 0.059                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 2                 | Sites               | 0.91                 | 0.00863                 | 0.0105                 | 0.0281                    | 0.035                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 7                 | Sites               | 58                   | 0.00127                 | 0.0032                 | 0.0187                    | 0.059                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 26                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 5                 | Sites               | 13                   | 0.0252                  | 0.0349                 | 0.177                     | 0.248                   | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 8                 | Sites               | 1.16                 | 1e-04                   | 0.00095                | 0.00325                   | 0.0064                  | ug/L        |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                                     | 2002 - 2010 | 126                           | 18                | Samples             | 14                   |                         |                        |                           | 1.61                    | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.000000106                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) | < LOD                        | ug/l  |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.63689     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 264.401     | degree C                |       |
| Boiling point                                                  | TEST QSAR  |             |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 1.3E-10     | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 2.21E-11    | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000446592 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.000406443 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 3.45799     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 0.907821    | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 6.36E-10    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 1.21447     | no units                |       |



**Sulfometuron methyl**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 357              | USEPA. 2015. Sulfometuron Methyl. Draft Human Health Risk Assessment in Support of Registration Review. EPA-HQ-OPP-2012-0433-0026. DP No. D427028. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                      |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**Tamoxifen**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                         |
|-----------------|-----------------------------------------|
| Name:           | Tamoxifen                               |
| CASRN:          | 10540-29-1                              |
| DTXSID:         | <a href="#">DTXSID1034187</a>           |
| Use:            | Antiestrogen; antineoplastic (hormonal) |
| Chemical Notes: |                                         |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.31                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 7       | non-cancer effects | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                                                                                                  | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 0.6                    | lowest therapeutic dose: nonsteroidal antiestrogen/ treatment of metastatic breast cancer/adjuvant breast cancer treatment/ductal carcinoma in situ/prophylaxis in women at high risk for cancer | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.187                        | 90th Percentile                               | All Ambient Water                    | NWIS   | 2008-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Tamoxifen

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value       | Units     | Assessment Source  | Critical Study              | Critical Effect                                                                                                                                                                                 | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                 |
|------------------------------------|-------------|-----------|--------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 8.33333E-05 | mg/kg/day | FDA 2018; NIH 2018 | Andrx Pharmaceuticals, Inc. | lowest therapeutic dose:nonsteroidal antiestrogen/ treatment of metastatic breast cancer/adjuvant breast cancer treatment/ductal carcinoma in situ/prophylaxis in women at high risk for cancer | bottle-fed infants | 151                         | 0.560                      | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 8.33333E-05 | mg/kg/day | FDA 2018; NIH 2018 | Andrx Pharmaceuticals, Inc. | lowest therapeutic dose:nonsteroidal antiestrogen/ treatment of metastatic breast cancer/adjuvant breast cancer treatment/ductal carcinoma in situ/prophylaxis in women at high risk for cancer | general population | 33.8                        | 2.00                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                            | Value       | Units    | Source              | Notes |
|---------------------------------------------------------|-------------|----------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |          |                     |       |
| Cancer Classification (CC)                              | 1           | no units | WHO IARC            |       |
| Screening level for pharmaceutical - general population | 0.001960784 | mg/L     | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.000555556 | mg/L     | EPA Office of Water |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| Percent of active toxcast in vitro assays tested | 40.13 | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0058345 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.096     | no units | TEST QSAR |       |
| Developmental toxin test | 0.788     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
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Tamoxifen  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 531                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 75                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 456                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 193                           | 1                 | Sites               | 0.52                 | 0.187                   | 0.187                  | 0.187                     | 0.187                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 333                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 526                           | 1                 | Sites               | 0.19                 | 0.187                   | 0.187                  | 0.187                     | 0.187                   | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                       | 2013 - 2015 | 1,097                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 20                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 4.05E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|----------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.36164    | days                    |       |
| Boiling point                                                  | OPERA QSAR | 419.341    | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 428.393    | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 2.07E-08   | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 5.27E-09   | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00000858 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00000274 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 1210.92    | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 345.144    | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 2.21E-08   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 6.2335     | no units                |       |

**Tamoxifen**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                  |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. Environmental Science and Technology 53: 2950-2960.                                                   |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                  |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. Science of The Total Environment. v581-582, (909-922). |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                             |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. Science of the Total Environment, 636, 69-79.        |

## Tebuconazole

CCL 5 Contaminant Information Sheet

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Tebuconazole                  |
| CASRN:          | 107534-96-3                   |
| DTXSID:         | <a href="#">DTXSID9032113</a> |
| Use:            | Fungicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 | X |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.0058                     |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 5       | reproductive and developmental effects | 1          | 5         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                        | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 40                     | decreases in body weights, absolute brain weights, brain measurements, and motor activity in offspring | bottle-fed infants | OPP               | 2019                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.2307                       | 90th Percentile                               | Finished Water                       | UCMR4  | 2018-2019 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |
| Not Applicable |                |                |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Tebuconazole

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                                                                                        | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|--------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.029 | mg/kg/day | OPP 2019          | Parker 2000    | decreases in body weights, absolute brain weights, brain measurements, and motor activity in offspring | bottle-fed infants | 151                         | 38.4       | [427]                    |       |
| Cancer Classification (CC)         | C     |           | OPP 2019          |                |                                                                                                        |                    |                             |            | [427]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 0.19  | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.029 | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.19  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.19  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.029 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 5000  | mg/kg   | NIH HSDB                | max   |
| LD50                                             | 625   | mg/kg   | NIH HSDB                | min   |
| Percent of active toxcast in vitro assays tested | 17.05 | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0101391 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.499     | no units | TEST QSAR |       |
| Developmental toxin test | 0.483     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Tebuconazole  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 | 3,648                         | 2                 | Sites               | 0.05                 | 0.21                    | 0.222                  | 0.231                     | 0.233                   | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,788                         | 165               | Sites               | 9.23                 | 0.00024                 | 0.00735                | 0.0285                    | 0.93                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 328                           | 163               | Sites               | 50                   | 0.00024                 | 0.00735                | 0.0284                    | 0.93                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,460                         | 2                 | Sites               | 0.14                 | 0.00035                 | 0.13                   | 0.207                     | 0.259                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 47               | 2,111,268                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 7                 | Sites               | 41                   | 0.0035                  | 0.0035                 | 0.0165                    | 0.15                    | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 435                           | 69                | Sites               | 16                   | 0.00044                 | 0.0118                 | 0.0784                    | 3.24                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 536                           | 2                 | Sites               | 0.37                 | 0.00584                 | 0.0103                 | 0.0702                    | 0.0959                  | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 971                           | 71                | Sites               | 7.31                 | 0.00044                 | 0.0118                 | 0.0859                    | 3.24                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 12                | Sites               | 5.24                 | 0.0035                  | 0.0058                 | 0.0377                    | 0.15                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 6                 | Sites               | 2.74                 | 0.0035                  | 0.014                  | 0.061                     | 0.083                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 6                 | Sites               | 50                   | 0.0035                  | 0.00465                | 0.026                     | 0.15                    | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 50                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 7                 | Sites               | 18                   | 0.0173                  | 0.0255                 | 0.041                     | 0.0421                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 1.58E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.17404     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 321.712     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 344.862     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000000022 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 9.29E-08    | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00010626  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0000893   | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 243.826     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 49.204      | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000000329 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.68215     | no units                |       |



**Tebuconazole**

CCL 5 Contaminant Information Sheet

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> .                                                                                                                                                              |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                                                                                                                                                                                |
| 427              | USEPA. 2019. Tebuconazole: Acute and Chronic Aggregate Dietary Exposure and Risk Assessments for Petition for the Establishment of Registrations and Permanent Tolerances for Residues in/on Watercress; Add Green-House Grown Tomato to Label and Crop Group Conversions/Expansions for Brassica Leafy Greens, Subgroup 4-16B, Except Watercress; Cottonseed, Subgroup 20C; Pome Fruit, Group 11-10; Stone Fruit, Group 12-12, Except Cherry; Small Vine Climbing Fruit, Except Fuzzy Kiwifruit, Subgroup 13-07F; Tropical and Subtropical Small Fruit, Inedible Peel, Subgroup 24A; Tree Nut, |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                                                                                                                                                                                          |

**Tebuthiuron**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Tebuthiuron                   |
| CASRN:          | 34014-18-1                    |
| DTXSID:         | <a href="#">DTXSID3024316</a> |
| Use:            | Herbicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

Draft CCL5 List Decision

Not List

Final Hazard Quotient (HQ)

0.00024

ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 4       | reproductive and developmental effects | 10         | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                          | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 200                    | decreased body weights in F1 females; decreased up body weights in F1 and F2 generations | bottle-fed infants | OPP               | 2014                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.048                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |
| Not Applicable |                |                |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Tebuthiuron

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study   | Critical Effect                                                                           | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|------------------|-------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.14  | mg/kg/day | OPP 2014          | Hoyt et al. 1981 | decreased body weights in F1 females; decreased pup body weights in F1 and F2 generations | bottle-fed infants | 151                         | 185        | [336]                    |       |
| Cancer Classification (CC)         | D     |           | OPP 2014          |                  |                                                                                           |                    |                             |            | [336]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units | Source         | Notes |
|---------------------------------------------|-------|-------|----------------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |                |       |
| 10-day Health Advisory                      | 3     | mg/L  | EPA DWSHA 2018 |       |
| Lifetime Health Advisory                    | 0.5   | mg/L  | EPA DWSHA 2018 |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 200   | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 644   | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 110   | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 31    | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 15    | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 72    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 1.28  | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0068865 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   |           |          | TEST QSAR |       |
| Developmental toxin test | 0.583     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Tebuthiuron  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 11,243                        | 1,134             | Sites              | 10                   | 0                       | 0.0106                 | 0.048                     | 17.3                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,224                         | 813               | Sites              | 37                   | 0                       | 0.01                   | 0.044                     | 6.4                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9,019                         | 321               | Sites              | 3.56                 | 0.00024                 | 0.0205                 | 0.146                     | 17.3                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 13               | 22,610                    | 2015 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 10                | Sites               | 59                   | 0.00035                 | 0.001                  | 0.0037                    | 0.055                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 918                           | 185               | Sites               | 20                   | 0.00031                 | 0.00667                | 0.0449                    | 1.4                     | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 3,084                         | 130               | Sites               | 4.22                 | 3.00E - 04              | 0.016                  | 0.13                      | 0.516                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 4,001                         | 315               | Sites               | 7.87                 | 3.00E - 04              | 0.00857                | 0.0603                    | 1.4                     | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 47                | Sites               | 21                   | 0.00035                 | 0.001                  | 0.0046                    | 0.43                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 41                | Sites               | 19                   | 0.00035                 | 0.0011                 | 0.05                      | 0.43                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 6                 | Sites               | 50                   | 0.00035                 | 0.001                  | 0.0044                    | 0.22                    | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 1,757                         | 31                | Sites               | 1.76                 | 0.0127                  | 0.052                  | 1.3                       | 3                       | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 3                 | Sites               | 7.89                 | 0.0125                  | 0.015                  | 0.0316                    | 0.0358                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 24                | Sites               | 3.48                 | 5e-04                   | 0.0026                 | 0.0145                    | 0.0317                  | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                                     | 2002 - 2010 | 134                           | 6                 | Samples             | 4.5                  |                         |                        |                           | 3.47                    | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Exposure exposure                               |      | 8.13E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.57479     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 334.1       | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 340.382     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00000229  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000000564 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0110523   | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00409261  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 2.60494     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 9.18333     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 1.38E-10    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 1.65206     | no units                |       |

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 336              | USEPA. 2014. Tebuthiuron: Draft Human Risk Assessment. EPA-HQ-OPP-2009-0327-0041. DP Nos. D414218 D418910 D418911. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                                      |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**Tefluthrin**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Tefluthrin                    |
| CASRN:          | 79538-32-2                    |
| DTXSID:         | <a href="#">DTXSID5032577</a> |
| Use:            | Insecticide                   |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              | X |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.001                      |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects | 3          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 10                     | increased incidence of tremors | general population | OPP               | 2019                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0101                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Tefluthrin

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study | Critical Effect                | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|----------------|--------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0017 | mg/kg/day | OPP 2019          | Stonard 1986   | increased incidence of tremors | general population | 33.8                        | 10.1       | [428]                    |       |
| Cancer Classification (CC)         | NL     |           | OPP 2019          |                |                                |                    |                             |            | [428]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value  | Units     | Source                                  | Notes |
|---------------------------------------------|--------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |        |           |                                         |       |
| Acute Human Health Benchmark                | 0.011  | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.0017 | mg/kg/day | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.011  | mg/L      | Health-based screening levels from USGS |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 22        | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 57        | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 3         | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 54.400002 | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 1         | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 13.5      | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 9.38      | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 7.5       | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 2.5       | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0001941 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.654     | no units | TEST QSAR |       |
| Developmental toxin test | 0.96      | no units | TEST QSAR |       |

## Tefluthrin

CCL 5 Contaminant Information Sheet

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 3,062                               | 7                    | Sites                 | 0.23                    | 0.004                      | 0.005                     | 0.0101                       | 0.015                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 197                                 | 6                    | Sites                 | 3.05                    | 0.004                      | 0.005                     | 0.0108                       | 0.015                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 2,865                               | 1                    | Sites                 | 0.03                    | 0.006                      | 0.006                     | 0.006                        | 0.006                      | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 36               | 350,395                      | 2016 | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                               | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|------------------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                                  |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                           | 2001 - 2013 | 10                                  | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water)          | 2008 - 2017 | 508                                 | 1                    | Sites                  | 0.2                     | 0.062                      | 0.062                     | 0.062                        | 0.062                      | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)            | 2008 - 2017 | 956                                 | 4                    | Sites                  | 0.42                    | 0.002                      | 0.0035                    | 0.004                        | 0.004                      | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)              | 2008 - 2017 | 1,463                               | 5                    | Sites                  | 0.34                    | 0.002                      | 0.004                     | 0.033                        | 0.062                      | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated) | 2001 - 2013 | 123                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                        | 2001 - 2013 | 113                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                          | 2001 - 2013 | 10                                  | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| Arnold et al. 2016 (Filtered) [7]                                      | 2012 - 2013 | 106                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                            |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Estimated Concentration in Water</b>                                | <b>Date</b> | <b>Source</b>                       | <b>Value</b>         | <b>Units</b>           | <b>Model</b>            | <b>Notes</b>               |                           |                              |                            |             |       |
|                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expcast exposure                                   |      | 0.000000183                                   |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.53756     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 306.216     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 289.657     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.000042    | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.00000345  | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 8.52E-08    | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000000104 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 1246.21     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 567.545     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 4.43E-08    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 6.47305     | no units                |       |



**Tefluthrin**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 428              | USEPA. 2019. Tefluthrin: Updated Human Health Draft Risk Assessment in Support of Registration Review. DP No. D453462. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                                  |

**Terbacil**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |               |
|-----------------|---------------|
| Name:           | Terbacil      |
| CASRN:          | 5902-51-2     |
| DTXSID:         | DTXSID8024317 |
| Use:            | Herbicide     |
| Chemical Notes: |               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.00035                    |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 4       | reproductive and developmental effects | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                     | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 400                    | decreased pup body weights pnd 7-21 | bottle-fed infants | OPP               | 2019                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.1418                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2 | RD 3           |
|----------------|------|----------------|
| Not Applicable | X    | Not Applicable |

**Basis**

Terbacil does not appear to occur at health levels of concern in PWSs and EPA has made a determination that terbacil does not present a meaningful opportunity for health risk reduction. While terbacil has been found in ambient waters at the levels less than the HRL of 90 µg/L (as well as ½ the HRL) [a,b], it was not found in the UCMR 1 survey of public water supplies [c].

[a] Kolpin & Martin, 2003 [123]; [b] Martin, Crawford, & Larson, 2003 [134]; [c] USEPA, 2008 [297]; as cited in USEPA, 2008 [296]

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Terbacil

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                     | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|-------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.33  | mg/kg/day | OPP 2019          | Edwards 2017   | decreased pup body weights pnd 7-21 | bottle-fed infants | 151                         | 437        | [429]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2019          |                |                                     |                    |                             |            | [429]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units | Source         | Notes |
|---------------------------------------------|-------|-------|----------------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |                |       |
| 10-day Health Advisory                      | 0.3   | mg/L  | EPA DWSHA 2018 |       |
| Lifetime Health Advisory                    | 0.09  | mg/L  | EPA DWSHA 2018 |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 5000  | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 7500  | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 6.25  | mg/kg/day | EPA Toxicity Reference Database |       |
| NOAEL                                            | 1.25  | mg/kg/day | EPA Toxicity Reference Database |       |
| Percent of active toxcast in vitro assays tested | 5.54  | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0100231 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.196     | no units | TEST QSAR |       |
| Developmental toxin test | 0.982     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Terbacil  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

July 2021

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 | 3,873                         | 0                 | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 10,088                        | 235               | Sites               | 2.33                 | 0.0018                  | 0.024                  | 0.142                     | 1.52                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,037                         | 181               | Sites               | 8.89                 | 0.0018                  | 0.024                  | 0.126                     | 1.52                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 8,052                         | 54                | Sites               | 0.67                 | 0.003                   | 0.0195                 | 0.27                      | 1.05                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 17               | 13,550                    | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 67                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 13                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 402                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 671                           | 8                 | Sites               | 1.19                 | 0.0129                  | 0.0255                 | 0.135                     | 0.275                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 1,587                         | 6                 | Sites               | 0.38                 | 0.006                   | 0.063                  | 0.177                     | 0.245                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 2,258                         | 14                | Sites               | 0.62                 | 0.006                   | 0.0264                 | 0.192                     | 0.275                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 121                           | 3                 | Sites               | 2.48                 | 0.00118                 | 0.00118                | 0.00237                   | 0.002664                | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 114                           | 1                 | Sites               | 0.88                 | 0.002664                | 0.00266                | 0.00266                   | 0.002664                | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 8                             | 2                 | Sites               | 25                   | 0.00118                 | 0.00118                | 0.00118                   | 0.00118                 | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 501                           | 2                 | Sites               | 0.4                  | 0.008                   | 0.021                  | 0.0314                    | 0.034                   | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 1                 | Sites               | 2.63                 | 0.0154                  | 0.0154                 | 0.0154                    | 0.0154                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 1                 | Sites               | 0.14                 | 0.0072                  | 0.0072                 | 0.0072                    | 0.0072                  | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                   |      | 7.54E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 4.32238     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 277.667     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 300.294     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.00607559  | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.000000202 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0968241   | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0038815   | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 2.47838     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 4.57088     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.00000155  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 2.05194     | no units                |       |

**Terbacil**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 123              | Kolpin, D.W. and J.D. Martin. 2003. Pesticides in Ground Water: Summary Statistics; Preliminary Results from Cycle I of the National Water Quality Assessment Program (NAWQA), 1992-2001. Available on the Internet at: <a href="http://ca.water.usgs.gov/pnsp/pestgw/Pest-GW_2001_Text.html">http://ca.water.usgs.gov/pnsp/pestgw/Pest-GW_2001_Text.html</a> .                                                                    |
| 134              | Martin, J.D., C.G. Crawford, and S.J. Larson. 2003. Pesticides in Streams: Summary Statistics; Preliminary Results from Cycle I of the National Water Quality Assessment Program (NAWQA), 1992-2001. Available on the Internet at: <a href="http://ca.water.usgs.gov/pnsp/pestsw/Pest-SW_2001_Text.html">http://ca.water.usgs.gov/pnsp/pestsw/Pest-SW_2001_Text.html</a> .                                                         |
| 296              | USEPA. 2008. Regulatory Determinations Support Document for Selected Contaminants from the Second Drinking Water Contaminant Candidate List (CCL 2). EPA Report 815-R-08-012. June 2008.                                                                                                                                                                                                                                           |
| 297              | USEPA. 2008. The Analysis of Occurrence Data from the First Unregulated Contaminant Monitoring Regulation (UCMR 1) in Support of Regulatory Determinations for the Second Drinking Water Contaminant Candidate List. EPA 815-R-08-013. June.                                                                                                                                                                                       |
| 429              | USEPA. 2019. Terbacil: Human Health Draft Risk Assessment for Registration Review. EPA-HQ-OPP-2011-0054-0038. DP No. D446169. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                           |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**Terbufos**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Terbufos                      |
| CASRN:          | 13071-79-9                    |
| DTXSID:         | <a href="#">DTXSID2022254</a> |
| Use:            | Insecticide                   |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              | X |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.66                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 8       | non-cancer effects | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                  | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.3                    | plasma cholinesterase inhibition | general population | OPP               | 2006                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.1984                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     | X     |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3 |
|----------------|----------------|------|
| Not Applicable | Not Applicable | X    |

**Basis**

Terbufos regulation does not represent a meaningful opportunity for health risk reduction for persons served by PWSs. Although terbufos has the potential to cause adverse health effects, including ChE inhibition and reproductive effects [a,b,c], it does not appear to occur in PWSs with a frequency and at levels of public health concern [c,d]. Terbufos was not detected in any UCMR 1 samples collected by PWSs, using an MRL of 0.5 µg/L, which is slightly higher than the HRL (0.35 µg/L) [e,f,g,h].

[a] Shellenberger, 1984 [163]; [b] Shellenberger & Billups, 1986 [164]; [c] USEPA, 2006 [274]; [d] Bailey, 1988 [39]; [e] USEPA, 2007 [284]; [f] USEPA, 2008 [297]; [g] USEPA, 2010 [310]; [h] USEPA, 2015 [350]; as cited in USEPA, 2014 [334]

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Terbufos

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value   | Units     | Assessment Source | Critical Study                                 | Critical Effect                  | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|---------|-----------|-------------------|------------------------------------------------|----------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.00005 | mg/kg/day | OPP 2006          | American Cyanamid Co. 1986; Shellenberger 1984 | plasma cholinesterase inhibition | general population | 33.8                        | 0.296      | [267]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value  | Units | Source                             | Notes |
|---------------------------------------------|--------|-------|------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |        |       |                                    |       |
| 10-day Health Advisory                      | 0.005  | mg/L  | EPA DWSHA 2018                     |       |
| Lifetime Health Advisory                    | 0.0004 | mg/L  | EPA DWSHA 2018                     |       |
| Maximum Allowable Concentration (MAC)       | 0.001  | mg/L  | Canadian Drinking Water Guidelines |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value  | Units     | Source                          | Notes |
|--------------------------------------------------|--------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |        |           |                                 |       |
| LD50                                             | 2      | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 9.2    | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 0.2188 | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 0.015  | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 0.0854 | mg/kg/day | EPA Toxicity Reference Database |       |
| Percent of active toxcast in vitro assays tested | 8.45   | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value    | Units    | Source    | Notes |
|--------------------------|----------|----------|-----------|-------|
| <b>Modeled Data</b>      |          |          |           |       |
| LD50                     | 5.78E-06 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.005    | no units | TEST QSAR |       |
| Developmental toxin test | -0.779   | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Terbufos  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 | 295                           | 0                 | Sites              | 0                    |                         |                        |                           |                         | ug/L        |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 11,234                        | 33                | Sites              | 0.29                 | 0.002                   | 0.017                  | 0.198                     | 0.56                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,224                         | 29                | Sites              | 1.3                  | 0.002                   | 0.023                  | 0.194                     | 0.56                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 9,010                         | 4                 | Sites              | 0.04                 | 0.007                   | 0.01                   | 0.126                     | 0.202                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 23               | 2,259,511                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 4                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 1                 | Sites               | 5.88                 | 0.089                   | 0.089                  | 0.089                     | 0.089                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 44                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 898                           | 4                 | Sites               | 0.45                 | 0.006                   | 0.146                  | 0.212                     | 0.226                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 3,037                         | 1                 | Sites               | 0.03                 | 0.009                   | 0.009                  | 0.009                     | 0.009                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 3,934                         | 5                 | Sites               | 0.13                 | 0.006                   | 0.103                  | 0.208                     | 0.226                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 495                           | 1                 | Sites               | 0.2                  | 0.04                    | 0.04                   | 0.04                      | 0.04                    | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 0.00000011                              |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 403.714     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 315.407     | degree C                |       |
| Boiling point                                                  | TEST QSAR  |             |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000228304 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000148594 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0000298   | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0000625   | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 64.5795     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 125.893     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.00000263  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 4.32209     | no units                |       |



**Terbufos**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> .                                                     |
| 39               | Bailey, D.E. 1988. 14-Day oral toxicity study in the dog with AC 92 100 and its metabolites, CL 94 301 and CL94320. Unpublished report on HLA Study No. 362-190 (BASF RDI No.TE-420-007) from Hazleton Laboratories America, Inc., Vienna, VA, USA (as cited in USEPA, 2003).                                                                                                                                                                                                          |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                                                                     |
| 163              | Shellenberger, T. 1984. 28-Day Oral Toxicity in the Dog with AC 92,100: Report No. 87019. Unpublished study prepared by Tegeris Laboratories Inc. 89 p. (as cited in USEPA,2006).                                                                                                                                                                                                                                                                                                      |
| 164              | Shellenberger, T., and L.H. Billups. 1986. One-year oral toxicity study in purebred beagle dogs with AC 92 100. Unpublished report No. 8414 (BASF RDI No. TE-427-002) from Tegeris Laboratories, Inc., Laurel, MD, USA (as cited in USEPA, 2003).                                                                                                                                                                                                                                      |
| 267              | USEPA. 2006. Finalization of Interim Reregistration Eligibility Decisions (IREDs) and Interim Tolerance Reassessment and Risk Management Decisions (TREDs) for the Organophosphate Pesticides, and Completion of the Tolerance Reassessment and Reregistration Eligibility Process for the Organophosphate Pesticides. Reregistration Eligibility Decision for Terbufos. U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Washington, D.C. |
| 274              | USEPA. 2006. Reregistration Eligibility Decision for Terbufos. Office of Pesticide Programs. Available on the Internet at: <a href="http://www.epa.gov/pesticides/reregistration/REDs/terbufos_red.pdf">http://www.epa.gov/pesticides/reregistration/REDs/terbufos_red.pdf</a> .                                                                                                                                                                                                       |
| 284              | USEPA. 2007. Unregulated Contaminant Monitoring Regulation (UCMR) for Public Water Systems Revisions. Federal Register. Vol. 72, No. 2, p. 367, January 4, 2007.                                                                                                                                                                                                                                                                                                                       |
| 297              | USEPA. 2008. The Analysis of Occurrence Data from the First Unregulated Contaminant Monitoring Regulation (UCMR 1) in Support of Regulatory Determinations for the Second Drinking Water Contaminant Candidate List. EPA 815-R-08-013. June.                                                                                                                                                                                                                                           |
| 310              | USEPA. 2010. Data Management and Analytical Plan for the Second Unregulated Contaminant Monitoring Regulation (UCMR 2) Data. June 2010 Draft Report Submitted to EPA.                                                                                                                                                                                                                                                                                                                  |
| 334              | USEPA. 2014. Regulatory Determinations 3 Support Document. April 2014. EPA Publication # 815-R14-003.                                                                                                                                                                                                                                                                                                                                                                                  |
| 350              | USEPA. 2015. Occurrence Data from the Second Unregulated Contaminant Monitoring Regulation (UCMR 2). Including Appendices A-C. EPA 815-R-15-013. December 2015.                                                                                                                                                                                                                                                                                                                        |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                                                                        |

**Testosterone**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                   |
|-----------------|---------------------------------------------------|
| Name:           | Testosterone                                      |
| CASRN:          | 58-22-0                                           |
| DTXSID:         | <a href="#">DTXSID8022371</a>                     |
| Use:            | Medication (human and veterinary) and in research |
| Chemical Notes: |                                                   |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.0018                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 8       | non-cancer effects | 9          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                                                  | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 0.3                    | lowest therapeutic dose: replacement therapy in conditions associated with deficiency or absence of endogenous testosterone/antiestrogen therapy | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.000527                     | 90th Percentile                               | Finished Water                       | UCMR3  | 2013-2015 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Testosterone

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value       | Units     | Assessment Source  | Critical Study | Critical Effect                                                                                                                                  | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                 |
|------------------------------------|-------------|-----------|--------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 4.16667E-05 | mg/kg/day | FDA 2018; NIH 2018 | Impax Generics | lowest therapeutic dose: replacement therapy in conditions associated with deficiency or absence of endogenous testosterone/antiestrogen therapy | bottle-fed infants | 151                         | 0.280                      | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 4.16667E-05 | mg/kg/day | FDA 2018; NIH 2018 | Impax Generics | lowest therapeutic dose: replacement therapy in conditions associated with deficiency or absence of endogenous testosterone/antiestrogen therapy | general population | 33.8                        | 0.980                      | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                            | Value       | Units | Source              | Notes |
|---------------------------------------------------------|-------------|-------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |       |                     |       |
| Screening level for pharmaceutical - general population | 0.000980392 | mg/L  | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.000277778 | mg/L  | EPA Office of Water |       |

| Data Element                                      | Value | Units   | Source                  | Notes |
|---------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |       |         |                         |       |
| Percent of active toxicant in vitro assays tested | 15.74 | percent | EPA Chemistry Dashboard |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0135207 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | -0.018    | no units | TEST QSAR |       |
| Developmental toxin test | 1.04      | no units | TEST QSAR |       |

## Testosterone

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 | 1,201                               | 65                   | Sites                 | 5.41                    | 1.00E - 04                 | 0.00017                   | 0.000527                     | 0.0053                     | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 527                                 | 4                    | Sites                 | 0.76                    | 0.00042                    | 0.00069                   | 0.00122                      | 0.00149                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 29                                  | 0                    | Sites                 | 0                       |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 498                                 | 4                    | Sites                 | 0.8                     | 0.00042                    | 0.00069                   | 0.00122                      | 0.00149                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data      | Date         | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|-----------------------------------------------|--------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                         |              |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Glassmeyer et al 2017 (Finished) [86]         | 2007 - 2012  | 25                                  | NA                   | Sites                  | 0                       |                            |                           |                              |                            | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153] | 2009 - 2010  | 1                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                          |              |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Glassmeyer et al 2017 (Ambient) [86]          | 2007 - 2012  | 25                                  | NA                   | Sites                  | 4                       |                            | 0.00015                   |                              | 0.00015                    | ug/L        |       |
| Batt et al. 2016 (Ambient) [46]               | 2008 - 2009  | 182                                 | 3                    | Sites                  | 1.65                    | 0.0037                     | 0.0064                    | 0.29                         | 0.3614                     | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]            | 2012 - 2014  | 38                                  | 1                    | Sites                  | 2.63                    | 0.0011                     | 0.0011                    | 0.0011                       | 0.0011                     | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]       | 2013 - 2015  | 1,091                               | 1                    | Sites                  | 0.09                    | 0.003038                   | 0.00304                   | 0.00304                      | 0.003038                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]  | 2009 - 2010  | 2                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                   |              |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Scott et al. 2018 (Wastewater) [161]          | 2011 - 2017  | 21                                  | 2                    | Sites                  | 9.52                    | 0.000973                   | 0.000973                  | 0.000973                     | 0.000973                   | ug/L        |       |
| Kostich et al. 2014 (Wastewater) [126]        | not reported | 50                                  | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Estimated Concentration in Water</b>       | <b>Date</b>  | <b>Source</b>                       | <b>Value</b>         | <b>Units</b>           | <b>Model</b>            | <b>Notes</b>               |                           |                              |                            |             |       |
|                                               |              |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expcast exposure                                   |      | 3.14E-08                                      |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 68.9239     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 295.416     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 357.585     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.000000187 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.000000245 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000277495 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000130317 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 52.7161     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 80.5378     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 2.46E-08    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 3.24993     | no units                |       |

**Testosterone**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                          |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 46               | Batt, A. L., Kincaid, T. M., Kostich, M. S., Lazorchak, J. M., & Olsen, A. R. (2016). Evaluating the extent of pharmaceuticals in surface waters of the United States using a National-scale Rivers and Streams Assessment survey. <i>Environmental toxicology and chemistry</i> , 35(4), 874-881.      |
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. <i>Environmental Science and Technology</i> 53: 2950-2960.                                                    |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.        |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                          |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922). |
| 126              | Kostich MS, et al. 2014 Concentrations of prioritized pharmaceuticals in effluents from 50 large wastewater treatment plants in the US and implications for risk estimation. <i>Environ Pollut</i> . 2014 Jan;184:354-9. doi: 10.1016/j.envpol.2013.09.013. Epub 2013 Oct 3. PMID: 24095705.            |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                                     |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                      |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.        |

**Tetraconazole**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                                   |
|-----------------|-----------------------------------------------------------------------------------|
| Name:           | Tetraconazole                                                                     |
| CASRN:          | 112281-77-3                                                                       |
| DTXSID:         | <a href="#">DTXSID8034956</a>                                                     |
| Use:            | Fungicide used on blueberries, cereals, grapes, ornamentals, peanuts among others |
| Chemical Notes: |                                                                                   |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.00066                    |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 9          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                  | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 40                     | increased kidney weight and altered histopathology of the kidney | general population | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.02644                      | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Tetraconazole

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study    | Critical Effect                                                  | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|-------------------|------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0073 | mg/kg/day | OPP 2018          | Makin et al. 1990 | increased kidney weight and altered histopathology of the kidney | general population | 33.8                        | 43.2       | [410]                    |       |
| Cancer Classification (CC)         | NL     |           | OPP 2018          |                   |                                                                  |                    |                             |            | [410]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value  | Units     | Source                                  | Notes |
|---------------------------------------------|--------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |        |           |                                         |       |
| Acute Human Health Benchmark                | 3      | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.5    | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.047  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.047  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.0073 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LOAEL                                            | 100   | mg/kg/day | EPA Toxicity Reference Database | max   |
| LOAEL                                            | 2.95  | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 0.8   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 30    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 28.78 | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 23.9  | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 5.5   | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value | Units    | Source    | Notes |
|--------------------------|-------|----------|-----------|-------|
| <b>Modeled Data</b>      |       |          |           |       |
| LD50                     |       |          | TEST QSAR |       |
| Ames mutagenicity test   | 0.138 | no units | TEST QSAR |       |
| Developmental toxin test | 0.626 | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
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EPA - Office of Water

**Tetraconazole**

CCL 5 Contaminant Information Sheet

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**OCCURRENCE DATA**

**Scoring Data**

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,763                         | 60                | Sites               | 3.4                  | 0.00035                 | 0.00509                | 0.0264                    | 0.254                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 324                           | 55                | Sites               | 17                   | 0.00035                 | 0.00514                | 0.026                     | 0.208                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,439                         | 5                 | Sites               | 0.35                 | 0.00075                 | 0.00158                | 0.13                      | 0.254                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 31               | 134,273                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

**Non-Scoring Data**

| Non-Nationally Representative Water Data                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                           | 2001 - 2013 | 15                            | 6                 | Sites               | 40                   | 0.002                   | 0.0032                 | 0.0096                    | 0.084                   | ug/L        |       |
| <b>Ambient Water</b>                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)          | 2008 - 2017 | 433                           | 19                | Sites               | 4.39                 | 1.00E - 04              | 0.0089                 | 0.206                     | 0.462                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)            | 2008 - 2017 | 531                           | 1                 | Sites               | 0.19                 | 0.00359                 | 0.00359                | 0.00359                   | 0.00359                 | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)              | 2008 - 2017 | 964                           | 20                | Sites               | 2.07                 | 1.00E - 04              | 0.0082                 | 0.204                     | 0.462                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated) | 2001 - 2013 | 227                           | 6                 | Sites               | 2.64                 | 0.002                   | 0.0047                 | 0.0178                    | 0.03                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                        | 2001 - 2013 | 219                           | 1                 | Sites               | 0.46                 | 0.003164                | 0.00316                | 0.00316                   | 0.003164                | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                          | 2001 - 2013 | 10                            | 5                 | Sites               | 50                   | 0.002                   | 0.0062                 | 0.018                     | 0.03                    | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                     | 2012 - 2014 | 38                            | 1                 | Sites               | 2.63                 | 0.0219                  | 0.0219                 | 0.0219                    | 0.0219                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                      | 2012 - 2013 | 584                           | 4                 | Sites               | 0.68                 | 8e-04                   | 0.00135                | 0.00454                   | 0.0058                  | ug/L        |       |
| <b>Waste Water Effluent</b>                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 0.000000105                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.48195     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 339.08      | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 344.772     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00000175  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.00000171  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000928927 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0000151   | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 309.071     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 131.22      | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.00000273  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.52679     | no units                |       |



**Tetraconazole**

CCL 5 Contaminant Information Sheet

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> .             |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                               |
| 410              | USEPA. 2018. Tetraconazole: Human Health Risk Assessment for the Section 3 Registration for Application to add Crop Subgroup 6C; Dried Shelled Pea and Bean (except soybean) Subgroup 6C; Barley; Rapeseed Subgroup 20A; Wheat; and Forage, Fodder, and Straw of Cereal Grains Group 16. EPA-HQ-OPP-2016-0573-0005. DP No. D435706. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C. |

**Thiabendazole**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Thiabendazole                 |
| CASRN:          | 148-79-8                      |
| DTXSID:         | <a href="#">DTXSID0021337</a> |
| Use:            | Fungicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.000027                   |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 4       | non-cancer effects | 9          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 600                    | decreased body weight in males | general population | OPP               | 2019                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.0164                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Thiabendazole

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study            | Critical Effect                | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|---------------------------|--------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.1   | mg/kg/day | OPP 2019          | Merck Research Labs. 1993 | decreased body weight in males | general population | 33.8                        | 592        | [430]                    |       |
| Cancer Classification (CC)         | L/NL  |           | OPP 2019          |                           |                                |                    |                             |            | [430]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                            | Value       | Units     | Source                                  | Notes |
|---------------------------------------------------------|-------------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |           |                                         |       |
| Acute Human Health Benchmark                            | 0.3         | mg/L      | EPA HHBP                                |       |
| Acute PAD                                               | 0.05        | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark                          | 0.21        | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                            | 0.21        | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)                          | 0.033       | mg/kg/day | EPA HHBP                                |       |
| Screening level for pharmaceutical - general population | 0.156862745 | mg/L      | EPA Office of Water                     |       |
| Screening level for pharmaceutical - infants            | 0.044444444 | mg/L      | EPA Office of Water                     |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 1300  | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 4000  | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 28.1  | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 600   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 150   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 9.8   | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 6.87  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 100   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic LOAEL                                 | 37    | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 25    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 9.4   | mg/kg/day | EPA Toxicity Reference Database | min   |

| Data Element             | Value | Units    | Source    | Notes |
|--------------------------|-------|----------|-----------|-------|
| <b>Modeled Data</b>      |       |          |           |       |
| LD50                     |       |          | TEST QSAR |       |
| Ames mutagenicity test   | 0.575 | no units | TEST QSAR |       |
| Developmental toxin test | 0.486 | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
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EPA - Office of Water

Thiabendazole

CCL 5 Contaminant Information Sheet

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**OCCURRENCE DATA**

**Scoring Data**

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                    |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 627                           | 20                | Sites              | 3.19                 | 0.00098                 | 0.00488                | 0.0164                    | 0.115                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 76                            | 17                | Sites              | 22                   | 0.00098                 | 0.00453                | 0.0168                    | 0.115                   | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 551                           | 3                 | Sites              | 0.54                 | 0.00187                 | 0.00673                | 0.00774                   | 0.00818                 | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 1                | 23,140                    | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 5                | 13,653                     | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

**Non-Scoring Data**

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Furlong et al 2017 (Finished) [83]                                                     | 2007 - 2012 | NA                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Glassmeyer et al 2017 (Finished) [86]                                                  | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 501                           | 33                | Sites               | 6.59                 | 0.00101                 | 0.00491                | 0.019                     | 0.176                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 841                           | 4                 | Sites               | 0.48                 | 0.00641                 | 0.015                  | 0.0826                    | 0.127                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 1,341                         | 37                | Sites               | 2.76                 | 0.00101                 | 0.00518                | 0.0191                    | 0.176                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 41                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Furlong et al 2017 (Ambient) [83]                                                      | 2007 - 2012 | NA                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                                                   | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 12                | Sites               | 32                   | 0.0039721               | 0.0117                 | 0.0161                    | 0.0421837               | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                                                | 2013 - 2015 | 1,106                         | 2                 | Sites               | 0.18                 | 0.0064082               | 0.169                  | 0.3                       | 0.3324209               | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Stackelberg et al. (2004) via Kostich et al. 2010 (Ambient) [127]                      | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.011                   | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                                                   | 2011 - 2017 | 21                            | 19                | Sites               | 90                   | 0.0030236               | 0.0169                 | 0.0262                    | 0.1126352               | ug/L        |       |
| Glassmeyer et al. (2005) via Kostich et al. 2010 (Wastewater) [127]                    | 2010        | NA                            | NA                |                     |                      |                         |                        |                           | 0.515                   | ug/L        |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 7.28E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 2.58879     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 326.584     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 403.909     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 6.6E-09     | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000000706 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.000311564 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.000156675 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 7.89835     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 18.197      | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 6.93E-08    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.37325     | no units                |       |

**Thiabendazole**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                         |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. <i>Environmental Science and Technology</i> 53: 2950-2960.                                                                                   |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                       |
| 83               | Furlong, E.T., Batt, A.L., Glassmeyer, S.T., Noriega, M.C., Kolpin, D.W., Mash, H., Schenck, K.M. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States: Pharmaceuticals. <i>Science of The Total Environment</i> . 579 (1629-1642).                        |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922).                                |
| 127              | Kostich, MS, et al., 2010. Predicting variability of aquatic concentrations of human pharmaceuticals. <i>Sci. Total Environ</i> . 408 (20), 4504e4510.                                                                                                                                                                                 |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                     |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.                                       |
| 430              | USEPA. 2019. Thiabendazole. Acute and Chronic Aggregate (Food and Drinking Water) Dietary Exposure and Risk Assessments in Support of Registration Review. EPA-HQ-OPP-2014-0175-0028. DP No. D450527. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                       |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society. |

**Thiamethoxam**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Thiamethoxam                  |
| CASRN:          | 153719-23-4                   |
| DTXSID:         | <a href="#">DTXSID2034962</a> |
| Use:            | Insecticide                   |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 6.6                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 5       | reproductive and developmental effects | 1          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                            | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 20                     | increased incidence and severity of tubular atrophy in testes of F1 males, sperm abnormalities in F1 males | bottle-fed infants | OPP               | 2016                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|------|
| 131.77                       |                                               | EDWC SW (acute)                      | OPP    | 2016 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |
| Not Applicable |                |                |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Thiamethoxam

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study      | Critical Effect                                                                  | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|---------------------|----------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.012 | mg/kg/day | OPP 2016          | Winkler et al. 1998 | increased incidence and severity of tubular atrophy in testes of F1 males (pups) | bottle-fed infants | 151                         | 15.9       | [372]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2016          |                     |                                                                                  |                    |                             |            | [372]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                      | Value | Units     | Source                                  | Notes |
|---------------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |       |           |                                         |       |
| Acute Health-Based Guidance Value                 | 0.4   | mg/L      | MN DOH                                  |       |
| Acute Human Health Benchmark                      | 2.3   | mg/L      | EPA HHBP                                |       |
| Acute PAD                                         | 0.35  | mg/kg/day | EPA HHBP                                |       |
| Chronic Health-Based Guidance Value               | 0.2   | mg/L      | MN DOH                                  |       |
| Chronic Human Health Benchmark                    | 0.077 | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                      | 0.077 | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)                    | 0.012 | mg/kg/day | EPA HHBP                                |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.2   | mg/L      | MN DOH                                  |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 1563  | mg/kg     | NIH HSDB                        |       |
| LOAEL                                            | 1.84  | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 1000  | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 0.8   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 500   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 0.64  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 14.3  | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 32    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 1.879 | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 9.27  | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value    | Units    | Source    | Notes |
|--------------------------|----------|----------|-----------|-------|
| <b>Modeled Data</b>      |          |          |           |       |
| LD50                     | 0.003656 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.998    | no units | TEST QSAR |       |
| Developmental toxin test | 1.036    | no units | TEST QSAR |       |

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OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 5                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 5                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 48               | 353,487                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects            | Minimum Conc. (Detects)                                                                                                                                                                                                                                                                       | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                                 |                                                                                                                                                                                                                                                                                               |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 10                            | 3                 | Sites               | 30                              | 0.0102                                                                                                                                                                                                                                                                                        | 0.0102                 | 0.0102                    | 0.0102                  | ug/L        |       |
| Klarich et al. 2017 (Finished) [117]                                                   | 2016        | 20                            | 19                | Sites               | 95                              | 0.00026                                                                                                                                                                                                                                                                                       | 0.00084                | 0.00215                   | 0.00415                 | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                                 |                                                                                                                                                                                                                                                                                               |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 131                           | 49                | Sites               | 37                              | 9.00E - 04                                                                                                                                                                                                                                                                                    | 0.007                  | 0.126                     | 4.37                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 12                            | 1                 | Sites               | 8.33                            | 0.0031                                                                                                                                                                                                                                                                                        | 0.0031                 | 0.0031                    | 0.0031                  | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 143                           | 50                | Sites               | 35                              | 9.00E - 04                                                                                                                                                                                                                                                                                    | 0.00695                | 0.126                     | 4.37                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 227                           | 2                 | Sites               | 0.88                            | 0.0102                                                                                                                                                                                                                                                                                        | 0.0102                 | 0.0102                    | 0.025                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 218                           | 0                 | Sites               | 0                               |                                                                                                                                                                                                                                                                                               |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 10                            | 2                 | Sites               | 20                              | 0.0102                                                                                                                                                                                                                                                                                        | 0.0102                 | 0.0102                    | 0.025                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 281                           | 43                | Sites               | 15                              | 0.0068                                                                                                                                                                                                                                                                                        | 0.113                  | 0.407                     | 2.06                    | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 8                 | Sites               | 21                              | 0.0019                                                                                                                                                                                                                                                                                        | 0.016                  | 0.0795                    | 0.1904                  | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                                 |                                                                                                                                                                                                                                                                                               |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                                 |                                                                                                                                                                                                                                                                                               |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                                 |                                                                                                                                                                                                                                                                                               |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | Date        | Source                        | Value             | Units               | Model                           | Notes                                                                                                                                                                                                                                                                                         |                        |                           |                         |             |       |
| Estimated Drinking Water Concentration (EDWC) in Surface Water (acute)                 | 2016        | OPP                           | 131.77            | ug/L                | Tier II Rice Model in Tailwater | The critical effect of male reproductive issues in F1 generation pups is considered a less-than-chronic response in a sensitive population. To be protective of this population, the modeled surface water acute concentration was selected as the occurrence concentration for thiamethoxam. |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 1.25E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.54394     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 278.329     | degree C                |       |
| Boiling point                                                  | TEST QSAR  |             |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00000154  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  |             |                         |       |
| Solubility in water                                            | OPERA QSAR | 0.000322793 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00732825  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 16.1043     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  |             |                         |       |
| Henry's Law constant                                           | OPERA QSAR | 6.73E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | -0.144367   | no units                |       |



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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                         |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                       |
| 117              | Klarich, K.L., Pflug, N.C., DeWald, E.M., Hladik, M.L., Kolpin, D.W., Cwiertny, D.M. and LeFevre, G.H., 2017. Occurrence of neonicotinoid insecticides in finished drinking water and fate during drinking water treatment. <i>Environmental Science &amp; Technology Letters</i> , 4(5), pp.168-173.                                  |
| 372              | USEPA. 2016. Thiamethoxam. Acute and Chronic Aggregate Dietary (Food and Drinking Water) Exposure and Risk Assessments for Residues of Thiarnethoxam on Imported Banana. EPA-HQ-OPP-2015-0705-0007. DP No. D429717. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.         |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society. |

**Thiobencarb**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                               |
|-----------------|-----------------------------------------------|
| Name:           | Thiobencarb                                   |
| CASRN:          | 28249-77-6                                    |
| DTXSID:         | <a href="#">DTXSID6024337</a>                 |
| Use:            | Pre-emergent to early post-emergent herbicide |
| Chemical Notes: |                                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.0019                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 6          | 3         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect        | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 60                     | decreased body weights | general population | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.1156                       | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**Thiobencarb**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect        | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.01  | mg/kg/day | OPP 2018          | Cummins 1984   | decreased body weights | general population | 33.8                        | 59.2       | [411]                    |       |
| Cancer Classification (CC)         | D     |           | OPP 2018          |                |                        |                    |                             |            | [411]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 7     | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 1     | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.06  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.06  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.01  | mg/kg/day | EPA HHBP                                |       |
| Public Health Goal                          | 0.042 | mg/L      | CalEPA OEHHA Public Health Goals        |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 1903  | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 560   | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 2     | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 200   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 100   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 25    | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 9.39  | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0057412 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.269     | no units | TEST QSAR |       |
| Developmental toxin test | 0.403     | no units | TEST QSAR |       |

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**OCCURRENCE DATA**

**Scoring Data**

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 10,703                        | 84                | Sites               | 0.78                 | 2.00E - 05              | 0.011                  | 0.116                     | 4.38                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,055                         | 76                | Sites               | 3.7                  | 2.00E - 05              | 0.011                  | 0.115                     | 4.38                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 8,648                         | 8                 | Sites               | 0.09                 | 0.004                   | 0.014                  | 0.056                     | 0.25                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 6                | 2,372,729                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 2                | 3,385                      | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

**Non-Scoring Data**

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 265                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 15                            | 5                 | Sites               | 33                   | 0.029                   | 0.0745                 | 0.151                     | 0.19                    | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 2,975                         | 2                 | Sites               | 0.07                 | 0.097                   | 0.848                  | 1.45                      | 1.6                     | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 936                           | 33                | Sites               | 3.53                 | 0.00093                 | 0.0369                 | 0.346                     | 12.4                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 2,045                         | 2                 | Sites               | 0.1                  | 0.003                   | 0.007                  | 0.0094                    | 0.011                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 2,980                         | 35                | Sites               | 1.17                 | 0.00093                 | 0.0359                 | 0.342                     | 12.4                    | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 227                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 10                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 7,197                         | 635               | Sites               | 8.82                 | 0.004                   | 0.949                  | 4.84                      | 150                     | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 1                 | Sites               | 2.63                 | 0.3429                  | 0.343                  | 0.343                     | 0.3429                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                   |      | 8.52E-08                                |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 2.94541     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 305.691     | degree C                |       |
| Boiling point                                                     | TEST QSAR  |             |                         |       |
| Vapor pressure                                                    | OPERA QSAR | 0.0000201   | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.000147571 | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000168437 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0000845   | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 130.611     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 25.0611     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.000000019 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 3.37599     | no units                |       |

**Thiobencarb**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 411              | USEPA. 2018. Thiobencarb - Registration Review Draft Human Health Risk Assessment. EPA-HQ-OPP-2011-0932-0037. DP No. D439288. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                           |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

## Thiram

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                           |
|-----------------|-------------------------------------------|
| Name:           | Thiram                                    |
| CASRN:          | 137-26-8                                  |
| DTXSID:         | <a href="#">DTXSID5021332</a>             |
| Use:            | Pesticide; rubber accelerator; antiseptic |
| Chemical Notes: |                                           |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 | X |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.028                      |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 3          | 5         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                                                                            | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 90                     | changes in hematology, clinical chemistry, incidences of bile duct hyperplasia, reduction in mean body weight gain, elevated cholesterol levels and increased liver weight | general population | OPP               | 2015                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|------|
| 2.5                          |                                               | EDWC SW 30-Year                      | OPP    | 2015 |

## PUBLIC NOMINATION STATUS

|                   |
|-------------------|
| Public Nomination |
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |
| Not Applicable |                |                |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Thiram

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study        | Critical Effect                                                                                                                                                            | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.015 | mg/kg/day | OPP 2015          | Kehoe 1991a and 1991b | changes in hematology, clinical chemistry, incidences of bile duct hyperplasia, reduction in mean body weight gain, elevated cholesterol levels and increased liver weight | general population | 33.8                        | 88.8       | [358]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2015          |                       |                                                                                                                                                                            |                    |                             |            | [358]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source   | Notes |
|---------------------------------------------|-------|-----------|----------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |          |       |
| Acute Human Health Benchmark                | 0.39  | mg/L      | EPA HHBP |       |
| Acute PAD                                   | 0.014 | mg/kg/day | EPA HHBP |       |
| Cancer Classification (CC)                  | 3     | no units  | WHO IARC |       |
| Chronic Human Health Benchmark              | 0.096 | mg/L      | EPA HHBP |       |
| Population-Adjusted Dose (PAD)              | 0.015 | mg/kg/day | EPA HHBP |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 1350      | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 210       | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 0.84      | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 24        | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 1.8       | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 7.5       | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 33.64     | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 7.0100002 | mg/kg/day | EPA Toxicity Reference Database |       |
| Subchronic NOAEL                                 | 2.35      | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0038107 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.476     | no units | TEST QSAR |       |
| Developmental toxin test | 0.772     | no units | TEST QSAR |       |

## Thiram

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 3                | 125,378                      | 2016 | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) | 19                  | 29,783                        | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) | 1M - 10M                     |

## Non-Scoring Data

| Non-Nationally Representative Water Data                                                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects                                                      | Minimum Conc.<br>(Detects)                                                                                                                                                                                                                                                                                                                                  | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                                                              |             |                                     |                      |                        |                                                                              |                                                                                                                                                                                                                                                                                                                                                             |                           |                              |                            |             |       |
|                                                                                                    |             |                                     |                      |                        |                                                                              |                                                                                                                                                                                                                                                                                                                                                             |                           |                              |                            |             |       |
|                                                                                                    |             |                                     |                      |                        |                                                                              |                                                                                                                                                                                                                                                                                                                                                             |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                                                               |             |                                     |                      |                        |                                                                              |                                                                                                                                                                                                                                                                                                                                                             |                           |                              |                            |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451]             | 1990 - 2018 | 16                                  | 0                    | Sites                  | 0                                                                            |                                                                                                                                                                                                                                                                                                                                                             |                           |                              |                            |             |       |
|                                                                                                    |             |                                     |                      |                        |                                                                              |                                                                                                                                                                                                                                                                                                                                                             |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                                                        |             |                                     |                      |                        |                                                                              |                                                                                                                                                                                                                                                                                                                                                             |                           |                              |                            |             |       |
|                                                                                                    |             |                                     |                      |                        |                                                                              |                                                                                                                                                                                                                                                                                                                                                             |                           |                              |                            |             |       |
|                                                                                                    |             |                                     |                      |                        |                                                                              |                                                                                                                                                                                                                                                                                                                                                             |                           |                              |                            |             |       |
| <b>Estimated Concentration in Water</b>                                                            | <b>Date</b> | <b>Source</b>                       | <b>Value</b>         | <b>Units</b>           | <b>Model</b>                                                                 | <b>Notes</b>                                                                                                                                                                                                                                                                                                                                                |                           |                              |                            |             |       |
| Estimated Drinking Water Concentration (EDWC) in Surface Water, 30-Year Mean (chronic, non-cancer) | 2015        | OPP                                 | 2.5                  | ug/L                   | Pesticide Root Zone Model (PRZM) - Exposure Analysis Modeling System (EXAMS) | The modeled surface water chronic, non-cancer concentration provided by the most recent available EPA OPP health assessment was selected as the occurrence concentration for thiram. This value coincides with the chronic critical effects of multiple signs of systemic toxicity and hematological alterations provided within the health effects report. |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expocast exposure                                  |      | 3.58E-08                                      |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 90.9543     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 305.681     | degree C                |       |
| Boiling point                                                     | TEST QSAR  |             |                         |       |
| Vapor pressure                                                    | OPERA QSAR | 0.0000166   | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  |             |                         |       |
| Solubility in water                                               | OPERA QSAR | 0.000151428 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000587489 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 3.67366     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 10.4954     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 2.01E-09    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 1.65192     | no units                |       |



**Thiram**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                  |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 358              | USEPA. 2015. Thiram. Revised Human Health Risk Assessment for the Import Use of Thiram on Avocado, PP#4E8250 and Banana, PP#4E8268. EPA-HQ-OPP-2014-0249-0004. DP No. D427383. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                       |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society. |

**Tin**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                                                                                                                                               |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name:           | Tin                                                                                                                                                                                           |
| CASRN:          | 7440-31-5                                                                                                                                                                                     |
| DTXSID:         | DTXSID1049801                                                                                                                                                                                 |
| Use:            | Metal; used in alloys and solder. Block tin is used to coat copper cooking utensils and lead sheet, or to line lead pipe for distilled water, beer, carbonated beverages, and some chemicals. |
| Chemical Notes: |                                                                                                                                                                                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 |                            |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity | Prevalence | Magnitude |
|---------|----------|------------|-----------|
|         |          | 8          | 8         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect | Target Pop. | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------|-------------|-------------------|----------------------|
|                                                          |                        |                 |             |                   |                      |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 23                           | 90th Percentile                               | Finished Water                       | NIRS   | 1984-1986 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |
| Not Applicable |                |                |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

Tin

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                  |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|--------------------------------------------------------|
|              |       |       | ATSDR 2005        |                |                 |                   |                             |            | [24]                     | NOTE: ATSDR declined to quantify chronic oral toxicity |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Developmental               | 2                           | El-Makawy, 2008    | Reproductive                 | 2                            | El-Makawy, 2008     | 2004-08-01           | 2020-03-25         | 3052                                           | 1                                               | 23                                             | 1                                                 |

**Other Health Data**

| Data Element                                | Value | Units     | Source    | Notes |
|---------------------------------------------|-------|-----------|-----------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |           |       |
| Chronic Health-Based Guidance Value         | 4     | mg/L      | MN DOH    |       |
| Intermediate Minimal Risk Level (MRL)       | 0.3   | mg/kg/day | CDC ATSDR |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

| Data Element             | Value | Units | Source    | Notes |
|--------------------------|-------|-------|-----------|-------|
| <b>Modeled Data</b>      |       |       |           |       |
| LD50                     |       |       | TEST QSAR |       |
| Ames mutagenicity test   |       |       | TEST QSAR |       |
| Developmental toxin test |       |       | TEST QSAR |       |

Tin

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 | 989                           | 14                | Sites              | 1.42                 | 3                       | 5                      | 23                        | 32                      | ug/L        |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1                             | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 1                             | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) | 10M - 50M                    |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                            | NA                | Sites               | 36                   |                         | 6.4                    |                           | 15.9                    | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 80                            | 15                | Sites               | 19                   | 0.02                    | 1.83                   | 200                       | 200                     | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 126                           | 47                | Sites               | 37                   | 0.01                    | 0.5                    | 5.3                       | 22                      | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 206                           | 62                | Sites               | 30                   | 0.01                    | 1                      | 20                        | 200                     | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                            | NA                | Sites               | 40                   |                         | 3.55                   |                           | 17.4                    | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                              | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      |                                         |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) | 2.42                         | ug/l  |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

**Tin**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                  |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 24               | ATSDR. 2005. Toxicological Profile for Tin and Tin Compounds. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                       |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. Science of The Total Environment. v581-582, (909-922). |

**Triallate**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                  |
|-----------------|----------------------------------|
| Name:           | Triallate                        |
| CASRN:          | 2303-17-5                        |
| DTXSID:         | <a href="#">DTXSID5024344</a>    |
| Use:            | Pre-emergent selective herbicide |
| Chemical Notes: |                                  |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.15                       |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 4       | carcinogen with linear MOA | 6          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                           | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.4                    | hepatocellular carcinomas and renal tubular cell adenomas | general population | OPP               | 2019                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.059                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

Triallate  
CCL 5 Contaminant Information Sheet  
HEALTH EFFECTS DATA

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**Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value  | Units                     | Assessment Source | Critical Study                       | Critical Effect                                                                       | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|---------------------------|-------------------|--------------------------------------|---------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.025  | mg/kg/day                 | OPP 2019          | Stout and Thake 1987; Vigneault 1988 | decreased survival; decreased mean body weights and increased adrenal weight in males | general population | 33.8                        | 148        | [431]                    |       |
| Cancer Slope Factor (CSF)          | 0.0717 | (mg/kg/day) <sup>-1</sup> | OPP 2019          | Stout et al. 1983                    | hepatocellular carcinomas and renal tubular cell adenomas                             | general population | 33.8                        | 0.413      | [431]                    |       |
| Cancer Classification (CC)         | C      |                           | OPP 2019          |                                      |                                                                                       |                    |                             |            | [431]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                | Value    | Units                     | Source                                  | Notes |
|---------------------------------------------|----------|---------------------------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |          |                           |                                         |       |
| Acute Human Health Benchmark                | 1        | mg/L                      | EPA HHBP                                |       |
| Acute PAD                                   | 0.05     | mg/kg/day                 | EPA HHBP                                |       |
| Cancer Slope Factor (CSF)                   | 0.0717   | (mg/kg/day) <sup>-1</sup> | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.16     | mg/L                      | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.000446 | mg/L                      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.16     | mg/L                      | Health-based screening levels from USGS |       |
| Health-Based Screening Level                | 0.000446 | mg/L                      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.025    | mg/kg/day                 | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                      | Value | Units     | Source                          | Notes |
|---------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |       |           |                                 |       |
| LD50                                              | 2700  | mg/kg     | NIH HSDB                        | max   |
| LD50                                              | 800   | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                             | 5     | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                             | 90    | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                             | 1.5   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                             | 30    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxicant in vitro assays tested | 15.9  | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0144544 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.687     | no units | TEST QSAR |       |
| Developmental toxin test | 0.189     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Triallate  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 9,433                         | 92                | Sites               | 0.98                 | 0.001                   | 0.008                  | 0.059                     | 0.65                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,030                         | 82                | Sites               | 4.04                 | 0.001                   | 0.008                  | 0.059                     | 0.65                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 7,403                         | 10                | Sites               | 0.14                 | 0.0011                  | 0.002                  | 0.021                     | 0.23                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 10               | 471,417                   | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 1                | 10                         | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 1                 | Sites               | 5.88                 | 0.12                    | 0.12                   | 0.12                      | 0.12                    | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 549                           | 2                 | Sites               | 0.36                 | 0.219                   | 0.236                  | 0.247                     | 0.254                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 1,094                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 1,643                         | 2                 | Sites               | 0.12                 | 0.219                   | 0.236                  | 0.247                     | 0.254                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 590                           | 1                 | Sites               | 0.17                 | 0.003                   | 0.003                  | 0.003                     | 0.003                   | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 584                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 0.000000102                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.39965     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 293.256     | degree C                |       |
| Boiling point                                                  | TEST QSAR  |             |                         |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00012696  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000402717 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0000293   | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.0000345   | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 453.67      | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 90.7821     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.000154671 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 4.51044     | no units                |       |



**Triallate**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 431              | USEPA. 2019. Triallate. Human Health Draft Risk Assessment Scoping Document in Support of Registration Review. EPA-HQ-OPP-2014-0573-0018. DP No. D452964. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                               |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                    |

**Tribufos**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Tribufos                      |
| CASRN:          | 78-48-8                       |
| DTXSID:         | <a href="#">DTXSID1024174</a> |
| Use:            | Insecticide; cotton defoliant |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 1.2                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 7       | non-cancer effects | 1          | 5         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                        | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.3                    | inhibition of red blood cell cholinesterase in females | bottle-fed infants | OPP               | 2015                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.36742                      | 90th Percentile                               | Finished Water                       | UCMR4  | 2018-2019 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       | X     | X     |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

|                |
|----------------|
| Not Applicable |
|----------------|

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Tribufos

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study          | Critical Effect                                        | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|-------------------------|--------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0002 | mg/kg/day | OPP 2015          | Sheets and Gilmore 2001 | inhibition of red blood cell cholinesterase in females | bottle-fed infants | 151                         | 0.265      | [359]                    |       |
| Cancer Classification (CC)         | L/NL   |           | OPP 2015          |                         |                                                        |                    |                             |            | [359]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value  | Units     | Source                                  | Notes |
|---------------------------------------------|--------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |        |           |                                         |       |
| Acute Human Health Benchmark                | 0.007  | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.001  | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.0006 | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.0006 | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.0001 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 435   | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 77    | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 0.4   | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 9     | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 0.1   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 3     | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 15.68 | percent   | EPA Chemistry Dashboard         |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0004487 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.199     | no units | TEST QSAR |       |
| Developmental toxin test | 0.084     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Tribufos  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

July 2021

Scoring Data

| Nationally Representative Water Data                           | Date                    | Number of PWS/ Sites/ Samples    | Number of Detects | PWS/ Sites/ Samples                                | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects)  | 90th Percentile (Detects)         | Maximum Conc. (Detects)                            | Conc. Units | Notes                               |
|----------------------------------------------------------------|-------------------------|----------------------------------|-------------------|----------------------------------------------------|----------------------|-------------------------|-------------------------|-----------------------------------|----------------------------------------------------|-------------|-------------------------------------|
| <b>Finished Water</b>                                          |                         |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019             | 3,647                            | 2                 | Sites                                              | 0.05                 | 0.0742                  | 0.237                   | 0.367                             | 0.4                                                | ug/L        |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| <b>Ambient Water</b>                                           |                         |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017             | 4,417                            | 21                | Sites                                              | 0.48                 | 0.00313                 | 0.016                   | 0.102                             | 0.246                                              | ug/L        |                                     |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017             | 430                              | 19                | Sites                                              | 4.42                 | 0.00313                 | 0.016                   | 0.0766                            | 0.176                                              | ug/L        |                                     |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017             | 3,987                            | 2                 | Sites                                              | 0.05                 | 0.009                   | 0.128                   | 0.199                             | 0.246                                              | ug/L        |                                     |
| <b>Pesticide Application Data</b>                              | <b>Number of States</b> | <b>Amount Applied (lbs/year)</b> | <b>Date</b>       | <b>Toxic Release Data</b>                          |                      |                         | <b>Number of States</b> | <b>Amount Released (lbs/year)</b> | <b>Chemical Production Data</b>                    |             | <b>Production Volume (lbs/year)</b> |
| Estimated Annual Agricultural Pesticide Use (USGS)             | 17                      | 2,903,908                        | 2016              | Toxic Release Inventory (TRI) Program (EPA) (2016) |                      |                         | 1                       | 10                                | Chemical Data Reporting (CDR) Results (EPA) (2016) |             | < 25K                               |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 13                            | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 779                           | 8                 | Sites               | 1.03                 | 0.005                   | 0.0255                 | 0.219                     | 0.227                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 2,510                         | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 3,288                         | 8                 | Sites               | 0.24                 | 0.005                   | 0.0255                 | 0.219                     | 0.227                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 6                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 6                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 1,773                         | 2                 | Sites               | 0.11                 | 0.01                    | 0.01                   | 0.01                      | 0.01                    | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg-bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                   |      | 0.000000176                             |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 273.028     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 343.854     | degree C                |       |
| Boiling point                                                     | TEST QSAR  |             |                         |       |
| Vapor pressure                                                    | OPERA QSAR | 0.00000738  | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.0000101   | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.00000337  | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000178238 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 333.052     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 42.462      | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.000000412 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 5.67262     | no units                |       |

**Tribufos**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 359              | USEPA. 2015. Tribufos: Human Health Draft Risk Assessment for Registration Review. EPA-HQ-OPP-2008-0883-0011. DP No. D357537. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                                                                                           |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 215-232). American Chemical Society.                                                                                                    |

**Tributyl phosphate (TNBP)**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                        |                                                                |
|------------------------|----------------------------------------------------------------|
| <b>Name:</b>           | Tributyl phosphate (TNBP)                                      |
| <b>CASRN:</b>          | 126-73-8                                                       |
| <b>DTXSID:</b>         | <a href="#">DTXSID3021986</a>                                  |
| <b>Use:</b>            | Flame-retardant component of aircraft hydraulic fluid; solvent |
| <b>Chemical Notes:</b> |                                                                |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxics                                 | X |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                                 |                                   |
|---------------------------------|-----------------------------------|
| <b>Draft CCL5 List Decision</b> | <b>Final Hazard Quotient (HQ)</b> |
| List                            | 0.057                             |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 3       | carcinogen with linear MOA | 9          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                          | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 3                      | bladder neoplasia (combined incidence of transitional cell and squamous cell carcinomas, and papillomas) | general population | PPRTV             | 2010                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.17                         | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                          |
|--------------------------|
| <b>Public Nomination</b> |
|                          |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

| Basis          |
|----------------|
| Not Applicable |

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Tributyl phosphate (TNBP)

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units          | Assessment Source | Critical Study           | Critical Effect                                                                                          | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|----------------|-------------------|--------------------------|----------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.011 | mg/kg/day      | PPRTV 2010        | Bio/dynamics Inc., 1991b | "cholinergic salivation"                                                                                 | general population | 33.8                        | 65.1       | [316]                    |       |
| Reference Dose (RfD) or Equivalent | 0.08  | mg/kg/day      | ATSDR 2012        | Arnold et al. 1997       | "urinary bladder hyperplasia"                                                                            | general population | 33.8                        | 473        | [31]                     |       |
| Cancer Slope Factor (CSF)          | 0.009 | (mg/kg/day)^-1 | PPRTV 2010        | Auletta et al. 1998a     | bladder neoplasia (combined incidence of transitional cell and squamous cell carcinomas, and papillomas) | general population | 33.8                        | 3.29       | [316]                    |       |
| Cancer Classification (CC)         | L     |                | PPRTV 2010        |                          |                                                                                                          |                    |                             |            | [316]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     | 2011-09-01           | 2019-12-17         | 454                                            | 0                                               | 0                                              |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source    | Notes |
|---------------------------------------------|-------|-----------|-----------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |           |       |
| Acute Minimal Risk Level (MRL)              | 1.1   | mg/kg/day | CDC ATSDR |       |
| Intermediate Minimal Risk Level (MRL)       | 0.08  | mg/kg/day | CDC ATSDR |       |
| Subchronic Provisional RfD                  | 0.03  | mg/kg/day | EPA PPRTV |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 20000 | mg/kg   | NIH HSDB                | max   |
| LD50                                             | 400   | mg/kg   | NIH HSDB                | min   |
| Percent of active toxcast in vitro assays tested | 5.4   | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0151705 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.08      | no units | TEST QSAR |       |
| Developmental toxin test | 0.354     | no units | TEST QSAR |       |

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EPA - Office of Water

Tributyl phosphate (TNBP)  
CCL 5 Contaminant Information Sheet  
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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 571                           | 36                | Sites              | 6.3                  | 0.006                   | 0.06                   | 0.17                      | 0.92                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 88                            | 28                | Sites              | 32                   | 0.006                   | 0.06                   | 0.17                      | 0.92                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 483                           | 8                 | Sites              | 1.66                 | 0.02                    | 0.05                   | 0.161                     | 0.17                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) | 1M - 10M                     |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                             | 1                 | Sites               | 100                  |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 724                           | 233               | Sites               | 32                   | 0.004                   | 0.027                  | 0.092                     | 4.69                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 692                           | 47                | Sites               | 6.79                 | 0.007                   | 0.0315                 | 0.352                     | 0.98                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,416                         | 280               | Sites               | 20                   | 0.004                   | 0.027                  | 0.1                       | 4.69                    | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                            | NA                | Sites               | 4                    |                         | 0.087                  |                           | 0.087                   | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                            | 14                | Sites               | 37                   | 0.0116                  | 0.0601                 | 0.114                     | 0.503                   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                             | 2                 | Sites               | 100                  | 0.1                     | 0.1                    | 0.1                       | 0.1                     | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                            | 20                | Sites               | 95                   | 0.082                   | 0.14                   | 0.27                      | 1.1                     | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                |      | 0.0000471                               |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.67987     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 284.939     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 281.321     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00171598  | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.000174985 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00139101  | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00312608  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 29.4881     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 8.26038     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 0.00000113  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 3.76206     | no units                |       |



**Tributyl phosphate (TNBP)**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

July 2021

| Reference Number | Full Reference                                                                                                                                                                                                                                                                                          |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 31               | ATSDR. 2012. Toxicological Profile for Phosphate Ester Flame Retardants. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                    |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.        |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922). |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                      |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.        |
| 316              | USEPA. 2010. Provisional Peer-Reviewed Toxicity Values for Tributyl phosphate. EPA/690/R-20/024F. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH.               |

**Triclopyr**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                                                                                                              |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name:           | Triclopyr                                                                                                                                                    |
| CASRN:          | 55335-06-3                                                                                                                                                   |
| DTXSID:         | <a href="#">DTXSID0032497</a>                                                                                                                                |
| Use:            | Herbicide; woody plants and many broad-leaved weeds in grassland, uncultivated land, industrial areas, coniferous forests, plantation crops and rice fields. |
| Chemical Notes: |                                                                                                                                                              |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

|                          |                            |
|--------------------------|----------------------------|
| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
| Not List                 | 0.001                      |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 9          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                  | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|----------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 300                    | proximal renal tube degeneration | general population | OPP               | 2016                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.3                          | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                   |
|-------------------|
| Public Nomination |
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Triclopyr

CCL 5 Contaminant Information Sheet

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study      | Critical Effect                  | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|---------------------|----------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.05  | mg/kg/day | OPP 2016          | Vedula et al., 1995 | proximal renal tube degeneration | general population | 33.8                        | 296        | [374]                    |       |
| Cancer Classification (CC)         | D     |           | OPP 2016          |                     |                                  |                    |                             |            | [374]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 1     | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 0.05  | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.3   | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.3   | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.05  | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 2140  | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 310   | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 2.5   | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 200   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 0.5   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 100   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 1.89  | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 2.5   | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 20    | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 0.5   | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 5     | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value    | Units    | Source    | Notes |
|--------------------------|----------|----------|-----------|-------|
| <b>Modeled Data</b>      |          |          |           |       |
| LD50                     | 0.002729 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.049    | no units | TEST QSAR |       |
| Developmental toxin test | 0.559    | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Triclopyr  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

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Scoring Data

| Nationally Representative Water Data                           | Date                    | Number of PWS/ Sites/ Samples    | Number of Detects | PWS/ Sites/ Samples                                | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects)  | 90th Percentile (Detects)         | Maximum Conc. (Detects)                            | Conc. Units | Notes                               |
|----------------------------------------------------------------|-------------------------|----------------------------------|-------------------|----------------------------------------------------|----------------------|-------------------------|-------------------------|-----------------------------------|----------------------------------------------------|-------------|-------------------------------------|
| <b>Finished Water</b>                                          |                         |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986             |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| <b>Ambient Water</b>                                           |                         |                                  |                   |                                                    |                      |                         |                         |                                   |                                                    |             |                                     |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017             | 7,742                            | 257               | Sites                                              | 3.32                 | 0.0028                  | 0.075                   | 0.3                               | 16                                                 | ug/L        |                                     |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017             | 1,196                            | 248               | Sites                                              | 21                   | 0.0028                  | 0.0748                  | 0.3                               | 16                                                 | ug/L        |                                     |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017             | 6,546                            | 9                 | Sites                                              | 0.14                 | 0.01                    | 0.16                    | 0.362                             | 1.1                                                | ug/L        |                                     |
| <b>Pesticide Application Data</b>                              | <b>Number of States</b> | <b>Amount Applied (lbs/year)</b> | <b>Date</b>       | <b>Toxic Release Data</b>                          |                      |                         | <b>Number of States</b> | <b>Amount Released (lbs/year)</b> | <b>Chemical Production Data</b>                    |             | <b>Production Volume (lbs/year)</b> |
| Estimated Annual Agricultural Pesticide Use (USGS)             | 43                      | 1,790,323                        | 2016              | Toxic Release Inventory (TRI) Program (EPA) (2016) |                      |                         |                         |                                   | Chemical Data Reporting (CDR) Results (EPA) (2016) |             |                                     |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 17                            | 7                 | Sites               | 41                   | 0.0027                  | 0.01                   | 0.0393                    | 0.566                   | ug/L        |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 479                           | 117               | Sites               | 24                   | 0.0057                  | 0.0723                 | 0.289                     | 13                      | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 1,059                         | 3                 | Sites               | 0.28                 | 0.04                    | 0.31                   | 0.314                     | 0.316                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 1,538                         | 120               | Sites               | 7.8                  | 0.0057                  | 0.0728                 | 0.299                     | 13                      | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 229                           | 28                | Sites               | 12                   | 0.002664                | 0.00965                | 0.0493                    | 3.6                     | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 219                           | 21                | Sites               | 9.59                 | 0.002664                | 0.00266                | 0.0164                    | 3.6                     | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 12                            | 7                 | Sites               | 58                   | 0.0027                  | 0.00999                | 0.0507                    | 0.847                   | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 1,372                         | 524               | Sites               | 38                   | 0.05                    | 0.208                  | 1.8                       | 250                     | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 6                 | Sites               | 16                   | 0.0198                  | 0.148                  | 2.9                       | 5.6413                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 690                           | 1                 | Sites               | 0.14                 | 0.246                   | 0.246                  | 0.246                     | 0.246                   | ug/L        |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                                     | 2002 - 2010 | 126                           | 13                | Samples             | 10                   |                         |                        |                           | 3.1                     | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 0.00000104                              |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|----------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 3.53784    | days                    |       |
| Boiling point                                                  | OPERA QSAR | 307.12     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 325.714    | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.00000216 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.00000741 | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.00157866 | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00113501 | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 3.14686    | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 6.223      | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 1.36E-09   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 2.51566    | no units                |       |

**Triclopyr**

CCL 5 Contaminant Information Sheet

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 374              | USEPA. 2016. Triclopyr. Revised Human Health Risk Assessment for Section 18 Emergency Exemption Request for Use on Sugarcane in Louisiana (LA). EPA-HQ-OPP-2017-0036-0002. DP No. D436366. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                                              |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**Triclosan**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                                                                                |
|-----------------|------------------------------------------------------------------------------------------------|
| Name:           | Triclosan                                                                                      |
| CASRN:          | 3380-34-5                                                                                      |
| DTXSID:         | <a href="#">DTXSID5032498</a>                                                                  |
| Use:            | Antiseptic/disinfectant/antimicrobial in personal care products and household goods; pesticide |
| Chemical Notes: |                                                                                                |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       | X |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.000068                   |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 4       | reproductive and developmental effects | 9          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                    | Target Pop.               | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------------------------------------------------|---------------------------|-------------------|----------------------|
| HRL                                                      | 2000                   | 20% decrease in T4 and associations with neurodevelopmental and cognitive deficits | women of childbearing age | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.135                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Triclosan

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study                            | Critical Effect                                                                    | Target Population         | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|-------------------------------------------|------------------------------------------------------------------------------------|---------------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.27  | mg/kg/day | OPP 2018          | Stoker et al., 2010; Zorilla et al., 2010 | 20% decrease in T4 and associations with neurodevelopmental and cognitive deficits | women of childbearing age | 35.4                        | 1530       | [408]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2018          |                                           |                                                                                    |                           |                             |            | [408]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                      | Value | Units     | Source                                  | Notes |
|---------------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b>       |       |           |                                         |       |
| Acute Health-Based Guidance Value                 | 0.05  | mg/L      | MN DOH                                  |       |
| Acute Human Health Benchmark                      | 2     | mg/L      | EPA HHBP                                |       |
| Acute PAD                                         | 0.3   | mg/kg/day | EPA HHBP                                |       |
| Chronic Health-Based Guidance Value               | 0.05  | mg/L      | MN DOH                                  |       |
| Chronic Human Health Benchmark                    | 2     | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                      | 2     | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)                    | 0.3   | mg/kg/day | EPA HHBP                                |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.05  | mg/L      | MN DOH                                  |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 3700  | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 4530  | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 15    | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 300   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 100   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 50    | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 36.79 | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 25    | mg/kg/day | EPA Toxicity Reference Database |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0000468 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.402     | no units | TEST QSAR |       |
| Developmental toxin test | 0.627     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Triclosan  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 567                           | 31                | Sites               | 5.47                 | 0.01                    | 0.04                   | 0.135                     | 0.56                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 88                            | 29                | Sites               | 33                   | 0.01                    | 0.04                   | 0.149                     | 0.56                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 479                           | 2                 | Sites               | 0.42                 | 0.02                    | 0.045                  | 0.06                      | 0.07                    | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) |                  |                            | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 2                             | 1                 | Sites               | 50                   | 3                       | 3                      | 3                         | 3                       | ug/L        |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Padhye et al. 2013 (Finished) [155]                           | 2009 - 2010 | 8                             | 5                 | Samples             | 62                   | 0                       | 1.4e-06                |                           | 5.96e-05 +/- 2.57e-05   | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 3                             | 1                 | Sites               | 33                   | 3                       | 3                      | 3                         | 3                       | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 725                           | 117               | Sites               | 16                   | 0.02                    | 0.09                   | 0.26                      | 15.6                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 690                           | 9                 | Sites               | 1.3                  | 0.03                    | 0.06                   | 0.071                     | 0.08                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,415                         | 126               | Sites               | 8.9                  | 0.02                    | 0.09                   | 0.254                     | 15.6                    | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                            | NA                | Sites               | 12                   |                         | 0.00271                |                           | 0.0035                  | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                            | 23                | Sites               | 61                   | 0.00152                 | 0.0146                 | 0.0928                    | 0.534                   | ug/L        |       |
| Padhye et al. 2013 (Ambient) [155]                            | 2009 - 2010 | 8                             | 5                 | Samples             | 62                   | 0                       | 3.3e-06                |                           | 0.0001058 +/- 6.31e-05  | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                            | 8                 | Sites               | 38                   | 0.12                    | 0.28                   | 0.949                     | 0.97                    | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | Date        | Source                        | Value             | Units               | Model                | Notes                   |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      | 0.00000141                              |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) | 172                          | ug/l  |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters (EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|----------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                       | OPERA QSAR | 4.47143     | days                    |       |
| Boiling point                                                  | OPERA QSAR | 342.344     | degree C                |       |
| Boiling point                                                  | TEST QSAR  | 369.746     | degree C                |       |
| Vapor pressure                                                 | OPERA QSAR | 0.000000453 | mmHg                    |       |
| Vapor pressure                                                 | TEST QSAR  | 0.00000453  | mmHg                    |       |
| Solubility in water                                            | OPERA QSAR | 0.0000298   | mol/L                   |       |
| Solubility in water                                            | TEST QSAR  | 0.00000454  | mol/L                   |       |
| Bioconcentration factor                                        | OPERA QSAR | 94.8967     | no units                |       |
| Bioconcentration factor                                        | TEST QSAR  | 1698.24     | no units                |       |
| Henry's Law constant                                           | OPERA QSAR | 6.29E-10    | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                    | OPERA QSAR | 4.94675     | no units                |       |



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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                          |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.        |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922). |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                      |
| 155              | Padhye, L.P., Yao, H., Kung'u, F.T., and Huang, C.H. Year-long evaluation on the occurrence and fate of pharmaceuticals, personal care products, and endocrine disrupting chemicals in an urban drinking water treatment plant. 2014. <i>Water Research</i> 51 (2014) 266-276.                          |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.        |
| 408              | USEPA. 2018. Registration Review Draft Risk Assessment for Triclosan. EPA-HQ-OPP-2012-0811-0020. DP Nos. 449415, 449416. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                     |

**Trifloxystrobin**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Trifloxystrobin               |
| CASRN:          | 141517-21-7                   |
| DTXSID:         | <a href="#">DTXSID4032580</a> |
| Use:            | Fungicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             | X |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.00017                    |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                               | Prevalence | Magnitude |
|---------|----------------------------------------|------------|-----------|
| 5       | reproductive and developmental effects | 9          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                                              | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 50                     | maternal decreased body weight and lesions in the liver, kidney and spleen; offspring decreased body weight during lactation | bottle-fed infants | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.008552                     | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Trifloxystrobin

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect                                                                                                              | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.038 | mg/kg/day | OPP 2018          | Khalil 1997    | maternal decreased body weight and lesions in the liver, kidney and spleen; offspring decreased body weight during lactation | bottle-fed infants | 151                         | 50.3       | [412]                    |       |
| Cancer Classification (CC)         | NL    |           | OPP 2018          |                |                                                                                                                              |                    |                             |            | [412]                    |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source                                  | Notes |
|---------------------------------------------|-------|-----------|-----------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |                                         |       |
| Acute Human Health Benchmark                | 69    | mg/L      | EPA HHBP                                |       |
| Acute PAD                                   | 2.5   | mg/kg/day | EPA HHBP                                |       |
| Chronic Human Health Benchmark              | 0.24  | mg/L      | EPA HHBP                                |       |
| Health-Based Screening Level                | 0.24  | mg/L      | Health-based screening levels from USGS |       |
| Population-Adjusted Dose (PAD)              | 0.038 | mg/kg/day | EPA HHBP                                |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value     | Units     | Source                          | Notes |
|--------------------------------------------------|-----------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |           |           |                                 |       |
| LD50                                             | 4000      | mg/kg     | NIH HSDB                        | min   |
| LD50                                             | 5000      | mg/kg     | NIH HSDB                        | max   |
| LOAEL                                            | 29.700001 | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 500       | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 250       | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 3.9       | mg/kg/day | EPA Toxicity Reference Database | min   |
| Percent of active toxcast in vitro assays tested | 24.02     | percent   | EPA Chemistry Dashboard         |       |
| Subchronic LOAEL                                 | 127       | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic LOAEL                                 | 150       | mg/kg/day | EPA Toxicity Reference Database | max   |
| Subchronic NOAEL                                 | 30        | mg/kg/day | EPA Toxicity Reference Database | min   |
| Subchronic NOAEL                                 | 32.8      | mg/kg/day | EPA Toxicity Reference Database | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0014555 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.189     | no units | TEST QSAR |       |
| Developmental toxin test | 0.886     | no units | TEST QSAR |       |

## Trifloxystrobin

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                                |             | Prevalence                          |                      |                       |                         | Magnitude                  |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
|                                                                |             | Prevalence                          |                      |                       |                         | Magnitude                  |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 1,763                               | 100                  | Sites                 | 5.67                    | 0.00011                    | 0.00115                   | 0.00855                      | 0.486                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 324                                 | 98                   | Sites                 | 30                      | 0.00011                    | 0.00115                   | 0.00807                      | 0.486                      | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 1,439                               | 2                    | Sites                 | 0.14                    | 0.00065                    | 0.12                      | 0.192                        | 0.24                       | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 48               | 796,042                      | 2016 | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             | Prevalence                          |                      |                        |                         | Magnitude                  |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 433                                 | 14                   | Sites                  | 3.23                    | 0.00014                    | 0.00475                   | 0.0638                       | 0.216                      | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 531                                 | 1                    | Sites                  | 0.19                    | 0.00226                    | 0.00226                   | 0.00226                      | 0.00226                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 964                                 | 15                   | Sites                  | 1.56                    | 0.00014                    | 0.00468                   | 0.0495                       | 0.216                      | ug/L        |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 254                                 | 1                    | Sites                  | 0.39                    | 0.067                      | 0.067                     | 0.067                        | 0.067                      | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                                  | 1                    | Sites                  | 2.63                    | 0.045                      | 0.045                     | 0.045                        | 0.045                      | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 584                                 | 1                    | Sites                  | 0.17                    | 6e-04                      | 6e-04                     | 6e-04                        | 6e-04                      | ug/L        |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                                            |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Estimated Concentration in Water</b>                                                | <b>Date</b> | <b>Source</b>                       | <b>Value</b>         | <b>Units</b>           | <b>Model</b>            | <b>Notes</b>               |                           |                              |                            |             |       |
|                                                                                        |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expcast exposure                                   |      | 1.91E-08                                      |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|-------------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.54712    | days                    |       |
| Boiling point                                                     | OPERA QSAR | 358.422    | degree C                |       |
| Boiling point                                                     | TEST QSAR  |            |                         |       |
| Vapor pressure                                                    | OPERA QSAR | 2.48E-08   | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.0000109  | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.00000387 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.00000448 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 99.2112    | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 83.1764    | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 1.28E-08   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 4.31154    | no units                |       |

**Trifloxystrobin**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 412              | USEPA. 2018. Trifloxystrobin. Human Health Risk Assessment for the Proposed New Use on Flax Seed and Increase of Established Tolerance on Aspirated Grain Fractions. EPA-HQ-OPP-2013-0074-0049. DP Nos. D442038 D444241. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                                                                                                |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

**Trifluralin**

CCL 5 Contaminant Information Sheet

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Trifluralin                   |
| CASRN:          | 1582-09-8                     |
| DTXSID:         | <a href="#">DTXSID4021395</a> |
| Use:            | Herbicide                     |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             | X |
| Human Neurotoxics                                 |   |
| PubMed Neurotoxics                                |   |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.0025                     |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 3       | carcinogen with linear MOA | 9          | 2         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                                                                  | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 10                     | thyroid follicular cell combined adenoma, papillary adenoma, cystadenoma, and carcinoma in males | general population | OPP               | 2018                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.025                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

**Basis**

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

**Trifluralin**

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value   | Units                     | Assessment Source | Critical Study       | Critical Effect                                                                                                                            | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|---------|---------------------------|-------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.024   | mg/kg/day                 | OPP 2018          | Adams et al. 1992    | increased frequency of abnormal stool, decreased body weight and weight gain, decreased erythrocyte and hemoglobin, increased thrombocytes | general population | 33.8                        | 142        | [413]                    |       |
| Cancer Slope Factor (CSF)          | 0.00296 | (mg/kg/day) <sup>-1</sup> | OPP 2018          | Emmerson et al. 1980 | thyroid follicular cell combined adenoma, papillary adenoma, cystadenoma, and carcinoma in males                                           | general population | 33.8                        | 10.0       | [413]                    |       |
| Cancer Classification (CC)         | C       |                           | OPP 2018          |                      |                                                                                                                                            |                    |                             |            | [413]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

**Other Health Data**

| Data Element                                | Value         | Units    | Source                                | Notes |
|---------------------------------------------|---------------|----------|---------------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |               |          |                                       |       |
| 10-day Health Advisory                      | 0.08          | mg/L     | EPA DWSHA 2018                        |       |
| Cancer Classification (CC)                  | 3             | no units | WHO IARC                              |       |
| Drinking Water Guideline Value              | 0.02          | mg/L     | WHO Drinking Water Quality Guidelines |       |
| Lifetime Health Advisory                    | 0.01          | mg/L     | EPA DWSHA 2018                        |       |
| Lifetime Health Advisory                    | 0.004         | mg/L     | EPA DWSHA 2018                        |       |
| Maximum Allowable Concentration (MAC)       | 0.045         | mg/L     | Canadian Drinking Water Guidelines    |       |
| Cancer Classification (CC)                  | Female.Mice P | no units | HHS NTP                               |       |
| Cancer Classification (CC)                  | Female.Rats N | no units | HHS NTP                               |       |
| Cancer Classification (CC)                  | Male.Mice N   | no units | HHS NTP                               |       |
| Cancer Classification (CC)                  | Male.Rats N   | no units | HHS NTP                               |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units     | Source                          | Notes |
|--------------------------------------------------|-------|-----------|---------------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |           |                                 |       |
| LD50                                             | 10000 | mg/kg     | NIH HSDB                        | max   |
| LD50                                             | 500   | mg/kg     | NIH HSDB                        | min   |
| LOAEL                                            | 3.8   | mg/kg/day | EPA Toxicity Reference Database | min   |
| LOAEL                                            | 500   | mg/kg/day | EPA Toxicity Reference Database | max   |
| NOAEL                                            | 0.8   | mg/kg/day | EPA Toxicity Reference Database | min   |
| NOAEL                                            | 225   | mg/kg/day | EPA Toxicity Reference Database | max   |
| Percent of active toxcast in vitro assays tested | 10.44 | percent   | EPA Chemistry Dashboard         |       |
| TD50                                             | 263   | mg/kg/day | NIH CPDB                        | min   |
| TD50                                             | 5440  | mg/kg/day | NIH CPDB                        | max   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0136773 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.445     | no units | TEST QSAR |       |
| Developmental toxin test | 1.145     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Trifluralin  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

July 2021

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 10,201                        | 485               | Sites              | 4.75                 | 0.001                   | 0.005                  | 0.025                     | 1.74                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 2,075                         | 421               | Sites              | 20                   | 0.001                   | 0.005                  | 0.025                     | 1.74                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 8,127                         | 64                | Sites              | 0.79                 | 0.001                   | 0.005                  | 0.014                     | 0.057                   | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) | 47               | 8,578,613                 | 2016 | Toxic Release Inventory (TRI) Program (EPA) (2016) | 13               | 11,482                     | Chemical Data Reporting (CDR) Results (EPA) (2016) |                              |

Non-Scoring Data

| Non-Nationally Representative Water Data                                               | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                                                  |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                                         | 2006 - 2020 | 60                            | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - WA (Finished)                                         | 2006 - 2011 | 481                           | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Finished)                                           | 2001 - 2013 | 15                            | 1                 | Sites              | 6.67                 | 0.0025                  | 0.0025                 | 0.0025                    | 0.0025                  | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                                          | 2009 - 2010 | 1                             | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                                                   |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                                           | 2006 - 2020 | 604                           | 3                 | Sites              | 0.5                  | 0.5                     | 31                     | 174                       | 210                     | ug/L        |       |
| Drinking Water Monitoring Data - WA (Source)                                           | 2006 - 2011 | 635                           | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water)                          | 2008 - 2017 | 811                           | 121               | Sites              | 15                   | 6.00E - 05              | 0.003                  | 0.0147                    | 0.323                   | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)                            | 2008 - 2017 | 2,670                         | 28                | Sites              | 1.05                 | 0.001                   | 0.003                  | 0.0164                    | 0.113                   | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)                              | 2008 - 2017 | 3,480                         | 149               | Sites              | 4.28                 | 6.00E - 05              | 0.003                  | 0.015                     | 0.323                   | ug/L        |       |
| USDA Pesticide Data Program (PDP) (Combined Groundwater And Untreated)                 | 2001 - 2013 | 225                           | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Groundwater)                                        | 2001 - 2013 | 218                           | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| USDA Pesticide Data Program (PDP) (Untreated)                                          | 2001 - 2013 | 8                             | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| Surface Water Database (SURF) California Dept. of Pesticide Regulation (Ambient) [451] | 1990 - 2018 | 2,711                         | 254               | Sites              | 9.37                 | 0.003                   | 0.024                  | 0.234                     | 3.3                     | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                                                     | 2012 - 2014 | 38                            | 15                | Sites              | 39                   | 2.75e-05                | 0.000138               | 0.0188                    | 0.0473                  | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                                                      | 2012 - 2013 | 106                           | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                                           | 2009 - 2010 | 2                             | 0                 | Sites              | 0                    |                         |                        |                           |                         |             |       |
| USGS, McKenzie River, Oregon, 2012 (Ambient) [158]                                     | 2002 - 2010 | 133                           | 3                 | Samples            | 2.3                  |                         |                        |                           | 0.002                   | ug/L        |       |
| <b>Waste Water Effluent</b>                                                            |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Estimated Concentration in Water                                                       | Date        | Source                        | Value             | Units              | Model                | Notes                   |                        |                           |                         |             |       |
|                                                                                        |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Exposure exposure                                  |      | 0.00000157                              |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.54291     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 365.036     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 369.442     | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.0000523   | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.00000292  | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000000496 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000002    | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 1513.15     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 149.624     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.0000755   | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 5.27633     | no units                |       |



**Trifluralin**

CCL 5 Contaminant Information Sheet

EPA-OGWDW and OST

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.                                                                                                                                   |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                                                                                                                                                 |
| 158              | Reconnaissance of Land-Use Sources of Pesticides in Drinking Water, McKenzie River, Oregon. U.S. Geological Survey Scientific Investigations Report 2012–5091, 46 p. plus appendixes.                                                                                                                                                                                                                                              |
| 413              | USEPA. 2018. Trifluralin: Acute, Chronic, and Cancer Aggregate Dietary (Food and Drinking Water) Exposure and Risk Assessment for the Section 3 Registration Action on Rosemary and Crop Group Conversions to Support Registration Review. EPA-HQ-OPP-2017-0420-0006. DP Nos. D445916 D447175. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, Washington, D.C.                          |
| 451              | Zhang, X., Ensminger, M., Deng, X., Budd, R., Xie, Y., Wang, D., ... & Goh, K. S. (2019). The Surface Water Database (SURF): A California Database for Surface Water Pesticide Monitoring Data. In <i>Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management</i> (pp. 215-232). American Chemical Society.                                                                                             |

## tris(1,3-dichloro-2-propyl) phosphate (TDCP)

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                                            |
|-----------------|------------------------------------------------------------|
| Name:           | tris(1,3-dichloro-2-propyl) phosphate (TDCP)               |
| CASRN:          | 13674-87-8                                                 |
| DTXSID:         | <a href="#">DTXSID9026261</a>                              |
| Use:            | Flame-retardant in plastics and as a secondary plasticizer |
| Chemical Notes: |                                                            |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxicants                              |  |
| PubMed Neurotoxicants                             |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.0016                     |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 5       | non-cancer effects | 9          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                     | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 100                    | renal tubule epithelial hyperplasia | general population | ATSDR             | 2012                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.157                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

## Basis

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## tris(1,3-dichloro-2-propyl) phosphate (TDCP)

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value | Units     | Assessment Source | Critical Study             | Critical Effect                     | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------------------|-------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.02  | mg/kg/day | ATSDR 2012        | Stauffer Chemical Co. 1981 | renal tubule epithelial hyperplasia | general population | 33.8                        | 118        | [31]                     |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Hepatic                     | 0.0026                      | Deng, 2018         | Cardiovascular, Respiratory  | 500                          | Wang, 2019          | 2011-09-01           | 2020-02-13         | 233                                            | 5                                               | 8                                              | 5                                                 |

## Other Health Data

| Data Element                                      | Value   | Units     | Source    | Notes |
|---------------------------------------------------|---------|-----------|-----------|-------|
| <b>Measured Data and Assessment Results</b>       |         |           |           |       |
| Chronic Health-Based Guidance Value               | 0.00008 | mg/L      | MN DOH    |       |
| Chronic Health-Based Guidance Value               | 0.009   | mg/L      | MN DOH    |       |
| Intermediate Minimal Risk Level (MRL)             | 0.05    | mg/kg/day | CDC ATSDR |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.02    | mg/L      | MN DOH    |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 1850  | mg/kg   | NIH HSDB                | min   |
| LD50                                             | 2670  | mg/kg   | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 24.79 | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value    | Units    | Source    | Notes |
|--------------------------|----------|----------|-----------|-------|
| <b>Modeled Data</b>      |          |          |           |       |
| LD50                     | 0.004529 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.601    | no units | TEST QSAR |       |
| Developmental toxin test | 0.546    | no units | TEST QSAR |       |

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 567                                 | 39                   | Sites                 | 6.88                    | 0.01                       | 0.07                      | 0.157                        | 0.52                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 88                                  | 33                   | Sites                 | 38                      | 0.01                       | 0.08                      | 0.163                        | 0.52                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 479                                 | 6                    | Sites                 | 1.25                    | 0.02                       | 0.03                      | 0.068                        | 0.08                       | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) | 10M - 50M                    |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                                  | NA                   | Sites                  | 0                       |                            |                           |                              |                            | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 720                                 | 278                  | Sites                  | 39                      | 0.01                       | 0.08                      | 0.21                         | 14.9                       | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 687                                 | 64                   | Sites                  | 9.32                    | 0.02                       | 0.095                     | 0.266                        | 0.44                       | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,407                               | 342                  | Sites                  | 24                      | 0.01                       | 0.08                      | 0.23                         | 14.9                       | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                                  | NA                   | Sites                  | 0                       |                            |                           |                              |                            | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                                  | 12                   | Sites                  | 32                      | 0.11                       | 0.336                     | 0.501                        | 0.583                      | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                                  | 19                   | Sites                  | 90                      | 0.13                       | 0.22                      | 0.317                        | 0.4                        | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                       | <b>Value</b>         | <b>Units</b>           | <b>Model</b>            | <b>Notes</b>               |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expcast exposure                                   |      | 0.00000181                                    |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value      | Units                   | Notes |
|-------------------------------------------------------------------|------------|------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 4.07587    | days                    |       |
| Boiling point                                                     | OPERA QSAR | 313.35     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 373.105    | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.00000524 | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.0000164  | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.0000446  | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.0000881  | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 12.6458    | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 14.9279    | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.00000168 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 3.64426    | no units                |       |

**tris(1,3-dichloro-2-propyl) phosphate (TDCP)**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                          |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 31               | ATSDR. 2012. Toxicological Profile for Phosphate Ester Flame Retardants. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                    |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.        |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922). |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                      |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.        |

**Tris(2-butoxyethyl) phosphate (TBEP)**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                        |                                                                                                      |
|------------------------|------------------------------------------------------------------------------------------------------|
| <b>Name:</b>           | Tris(2-butoxyethyl) phosphate (TBEP)                                                                 |
| <b>CASRN:</b>          | 78-51-3                                                                                              |
| <b>DTXSID:</b>         | <a href="#">DTXSID5021758</a>                                                                        |
| <b>Use:</b>            | Primary plasticizer for most resins and elastomers; floor finishes and waxes; flame-retarding agent. |
| <b>Chemical Notes:</b> |                                                                                                      |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxics                                 |  |
| PubMed Neurotoxics                                |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

**CONTAMINANT SUMMARY & DECISION**

|                                 |                                   |
|---------------------------------|-----------------------------------|
| <b>Draft CCL5 List Decision</b> | <b>Final Hazard Quotient (HQ)</b> |
| Not List                        |                                   |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity | Prevalence | Magnitude |
|---------|----------|------------|-----------|
|         |          | 9          | 5         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect | Target Pop. | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------|-------------|-------------------|----------------------|
|                                                          |                        |                 |             |                   |                      |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.98                         | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

|                          |
|--------------------------|
| <b>Public Nomination</b> |
|                          |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Tris(2-butoylethyl) phosphate (TBEP)

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes                                                                                                                                                                                                                                                  |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|              |       |       | ATSDR 2012        |                |                 |                   |                             |            | [31]                     | NOTE: Though there is no chronic duration MRL available, the intermediate duration MRL is 0.09 mg/kg/day based on hepatocyte vacuolization seen in an 18-week rat study. The ECHA DNEL value appears to be based on the same subchronic duration study |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value | Units     | Assessment Source | Critical Study | Critical Effect | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|-----------|-------------------|----------------|-----------------|--------------------|-----------------------------|----------------------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.25  | mg/kg/day | ECHA 2010         | Reyna 1987     | liver effects   | general population | 33.8                        | 1.48                       | [74]                     |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     | 2011-09-01           | 2019-10-22         | 148                                            | 0                                               | 4                                              |                                                   |

## Other Health Data

| Data Element                                | Value | Units     | Source    | Notes |
|---------------------------------------------|-------|-----------|-----------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |           |       |
| Acute Minimal Risk Level (MRL)              | 4.8   | mg/kg/day | CDC ATSDR |       |
| Intermediate Minimal Risk Level (MRL)       | 0.09  | mg/kg/day | CDC ATSDR |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 3000  | mg/kg   | NIH HSDB                |       |
| Percent of active toxcast in vitro assays tested | 10.9  | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0127938 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.045     | no units | TEST QSAR |       |
| Developmental toxin test | 0.501     | no units | TEST QSAR |       |

Tris(2-butoylethyl) phosphate (TBEP)  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

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## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 566                                 | 36                   | Sites                 | 6.36                    | 0.1                        | 0.2                       | 0.98                         | 9.9                        | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 88                                  | 26                   | Sites                 | 30                      | 0.1                        | 0.3                       | 1.18                         | 9.9                        | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 478                                 | 10                   | Sites                 | 2.09                    | 0.1                        | 0.1                       | 0.3                          | 0.5                        | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) | 1M - 10M                     |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                                  | NA                   | Sites                  | 0                       |                            |                           |                              |                            | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 725                                 | 291                  | Sites                  | 40                      | 0.04                       | 0.36                      | 1.03                         | 31.9                       | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 690                                 | 58                   | Sites                  | 8.41                    | 0.07                       | 0.4                       | 0.9                          | 8                          | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,415                               | 349                  | Sites                  | 25                      | 0.04                       | 0.36                      | 1.02                         | 31.9                       | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                                  | NA                   | Sites                  | 4                       |                            | 0.47                      |                              | 0.47                       | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                                  | 10                   | Sites                  | 26                      | 0.244                      | 0.488                     | 0.835                        | 1.11                       | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                                   | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                                  | 17                   | Sites                  | 81                      | 0.4                        | 2.9                       | 14.4                         | 19                         | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                       | <b>Value</b>         | <b>Units</b>           | <b>Model</b>            | <b>Notes</b>               |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expocast exposure                                  |      | 0.0000929                                     |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.67989     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 345.446     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 353.92      | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 0.0000171   | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 0.00000378  | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.00231797  | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000592925 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 6.05572     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 6.09537     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.00000725  | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 3.61399     | no units                |       |



**Tris(2-butoxyethyl) phosphate (TBEP)**

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July 2021

| Reference Number | Full Reference                                                                                                                                                                                                                                                                                          |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 31               | ATSDR. 2012. Toxicological Profile for Phosphate Ester Flame Retardants. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                    |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.        |
| 74               | ECHA. Registration Dossier for Tris(2-butoxyethyl) phosphate. European Chemicals Agency (ECHA), Helsinki, Finland. <a href="https://echa.europa.eu/registration-dossier/-/registered-dossier/14166/10">https://echa.europa.eu/registration-dossier/-/registered-dossier/14166/10</a> Accessed 2/5/2020. |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922). |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                      |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.        |

## Tris(chloroethyl)phosphate (TCEP)

CCL 5 Contaminant Information Sheet

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                           |
|-----------------|-------------------------------------------|
| Name:           | Tris(chloroethyl)phosphate (TCEP)         |
| CASRN:          | 115-96-8                                  |
| DTXSID:         | <a href="#">DTXSID5021411</a>             |
| Use:            | Flame-retardant in plastics and urethanes |
| Chemical Notes: |                                           |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxicants                              |  |
| PubMed Neurotoxicants                             |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.14                       |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity                   | Prevalence | Magnitude |
|---------|----------------------------|------------|-----------|
| 4       | carcinogen with linear MOA | 9          | 4         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                            | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|--------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 1                      | renal tubular cell adenomas and carcinomas | general population | PPRTV             | 2009                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.142                        | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

Tris(chloroethyl)phosphate (TCEP)  
CCL 5 Contaminant Information Sheet

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**HEALTH EFFECTS DATA****Qualifying Assessments, Exposure Factors, and HRL Determination**

| Data Element                       | Value | Units                     | Assessment Source | Critical Study                   | Critical Effect                                                  | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|-------|---------------------------|-------------------|----------------------------------|------------------------------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.2   | mg/kg/day                 | ATSDR 2012        | NTP 1991                         | renal tubule epithelial hyperplasia                              | general population | 33.8                        | 1180       | [31]                     |       |
| Reference Dose (RfD) or Equivalent | 0.007 | mg/kg/day                 | PPRTV 2009        | Matthews et al., 1990; NTP, 1991 | increased absolute and relative liver and kidney weights         | general population | 33.8                        | 41.4       | [304]                    |       |
| Cancer Slope Factor (CSF)          | 0.02  | (mg/kg/day) <sup>-1</sup> | PPRTV 2009        | NTP, 1991; Matthews et al., 1993 | combined incidence of renal tubular cell adenomas and carcinomas | general population | 33.8                        | 1.48       | [304]                    |       |
| Cancer Classification (CC)         | L     |                           | PPRTV 2009        |                                  |                                                                  |                    |                             |            | [304]                    |       |

**Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations**

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

**Literature Search Summary**

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Gastrointestinal, Hepatic   | 0.0256                      | Deng, 2018         | Systemic                     | 100                          | Yang, 2018          | 2011-09-01           | 2020-01-28         | 357                                            | 5                                               | 3                                              | 4                                                 |

**Other Health Data**

| Data Element                                      | Value          | Units     | Source    | Notes |
|---------------------------------------------------|----------------|-----------|-----------|-------|
| <b>Measured Data and Assessment Results</b>       |                |           |           |       |
| Acute Health-Based Guidance Value                 | 0.3            | mg/L      | MN DOH    |       |
| Cancer Classification (CC)                        | 3              | no units  | WHO IARC  |       |
| Chronic Health-Based Guidance Value               | 0.2            | mg/L      | MN DOH    |       |
| Chronic Health-Based Guidance Value               | 0.0005         | mg/L      | MN DOH    |       |
| Intermediate Minimal Risk Level (MRL)             | 0.6            | mg/kg/day | CDC ATSDR |       |
| Short-Term/Subchronic Health-Based Guidance Value | 0.2            | mg/L      | MN DOH    |       |
| Subchronic Provisional RfD                        | 0.02           | mg/kg/day | EPA PPRTV |       |
| Cancer Classification (CC)                        | Female.Mice EE | no units  | HHS NTP   |       |
| Cancer Classification (CC)                        | Female.Rats P  | no units  | HHS NTP   |       |
| Cancer Classification (CC)                        | Male.Mice EE   | no units  | HHS NTP   |       |
| Cancer Classification (CC)                        | Male.Rats P    | no units  | HHS NTP   |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value    | Units     | Source                  | Notes |
|--------------------------------------------------|----------|-----------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |          |           |                         |       |
| LD50                                             | 1866     | mg/kg     | NIH HSDB                | max   |
| LD50                                             | 430      | mg/kg     | NIH HSDB                | min   |
| Percent of active toxcast in vitro assays tested | 0.29     | percent   | EPA Chemistry Dashboard |       |
| TD50                                             | 23600000 | mg/kg/day | NIH CPDB                | max   |
| TD50                                             | 39.9     | mg/kg/day | NIH CPDB                | min   |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0015704 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | 0.976     | no units | TEST QSAR |       |
| Developmental toxin test | 0.483     | no units | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Tris(chloroethyl)phosphate (TCEP)  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

July 2021

Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects                | PWS/Sites/ Samples | Percent with Detects                               | Minimum Conc. (Detects) | Median Conc. (Detects)  | 90th Percentile (Detects)         | Maximum Conc. (Detects)                            | Conc. Units | Notes                               |
|----------------------------------------------------------------|-------------|-------------------------------|----------------------------------|--------------------|----------------------------------------------------|-------------------------|-------------------------|-----------------------------------|----------------------------------------------------|-------------|-------------------------------------|
| <b>Finished Water</b>                                          |             |                               |                                  |                    |                                                    |                         |                         |                                   |                                                    |             |                                     |
|                                                                |             | Prevalence                    |                                  |                    |                                                    | Magnitude               |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                                  |                    |                                                    |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                               |                                  |                    |                                                    |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                                  |                    |                                                    |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                                  |                    |                                                    |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                                  |                    |                                                    |                         |                         |                                   |                                                    |             |                                     |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                                  |                    |                                                    |                         |                         |                                   |                                                    |             |                                     |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                               |                                  |                    |                                                    |                         |                         |                                   |                                                    |             |                                     |
| <b>Ambient Water</b>                                           |             |                               |                                  |                    |                                                    |                         |                         |                                   |                                                    |             |                                     |
|                                                                |             | Prevalence                    |                                  |                    |                                                    | Magnitude               |                         |                                   |                                                    |             |                                     |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 567                           | 56                               | Sites              | 9.88                                               | 0.01                    | 0.07                    | 0.142                             | 0.44                                               | ug/L        |                                     |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 88                            | 42                               | Sites              | 48                                                 | 0.01                    | 0.07                    | 0.16                              | 0.44                                               | ug/L        |                                     |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 479                           | 14                               | Sites              | 2.92                                               | 0.01                    | 0.04                    | 0.086                             | 0.13                                               | ug/L        |                                     |
| <b>Pesticide Application Data</b>                              |             | <b>Number of States</b>       | <b>Amount Applied (lbs/year)</b> | <b>Date</b>        | <b>Toxic Release Data</b>                          |                         | <b>Number of States</b> | <b>Amount Released (lbs/year)</b> | <b>Chemical Production Data</b>                    |             | <b>Production Volume (lbs/year)</b> |
| Estimated Annual Agricultural Pesticide Use (USGS)             |             |                               |                                  |                    | Toxic Release Inventory (TRI) Program (EPA) (2016) |                         |                         |                                   | Chemical Data Reporting (CDR) Results (EPA) (2016) |             | 25K - 100K                          |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                            | NA                | Sites               | 0                    |                         |                        |                           |                         | ug/L        |       |
| Padhye et al. 2013 (Finished) [155]                           | 2009 - 2010 | 8                             | 7                 | Samples             | 88                   | 0                       | 3.7e-06                |                           | 2.04e-05 +/- 5.8e-06    | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Finished) [153]                 | 2009 - 2010 | 1                             | 0                 | Sites               | 0                    |                         |                        |                           |                         |             |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 725                           | 291               | Sites               | 40                   | 0.01                    | 0.07                   | 0.21                      | 7.66                    | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 690                           | 62                | Sites               | 8.99                 | 0.01                    | 0.06                   | 0.195                     | 1.88                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,415                         | 353               | Sites               | 25                   | 0.01                    | 0.07                   | 0.21                      | 7.66                    | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                            | NA                | Sites               | 4                    |                         | 0.065                  |                           | 0.065                   | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014 | 38                            | 15                | Sites               | 39                   | 0.0416                  | 0.18                   | 0.282                     | 0.487                   | ug/L        |       |
| Padhye et al. 2013 (Ambient) [155]                            | 2009 - 2010 | 8                             | 7                 | Samples             | 88                   | 0                       | 5.6e-06                |                           | 5.17e-05 +/- 1.9e-06    | ug/L        |       |
| USGS, Sioux Falls Area, 2012 (Ambient) [153]                  | 2009 - 2010 | 2                             | 2                 | Sites               | 100                  |                         |                        |                           |                         |             |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             | Prevalence                    |                   |                     |                      | Magnitude               |                        |                           |                         |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017 | 21                            | 21                | Sites               | 100                  | 0.2                     | 0.415                  | 0.57                      | 0.73                    | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------|-------|
| Expcast exposure                                   |      | 0.00000696                              |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.  
Blank fields indicate there were no data available.  
“All Water” data from NWIS and NAWQA are combined surface water and groundwater data.  
Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.  
State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.  
UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units      | Notes |
|-------------------------------------------------------------------|------------|-------------|------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 3.67993     | days       |       |
| Boiling point                                                     | OPERA QSAR | 321.803     | degree C   |       |
| Boiling point                                                     | TEST QSAR  | 295.075     | degree C   |       |
| Vapor pressure                                                    | OPERA QSAR | 0.0350806   | mmHg       |       |
| Vapor pressure                                                    | TEST QSAR  | 0.000645654 | mmHg       |       |
| Solubility in water                                               | OPERA QSAR | 0.0265137   | mol/L      |       |
| Solubility in water                                               | TEST QSAR  | 0.00506991  | mol/L      |       |
| Bioconcentration factor                                           | OPERA QSAR | 1.32172     | no units   |       |
| Bioconcentration factor                                           | TEST QSAR  | 5.01187     | no units   |       |
| Henry's Law constant                                              | OPERA QSAR | 0.000000128 | atm-m³/mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 1.52722     | no units   |       |

**Tris(chloroethyl)phosphate (TCEP)**

CCL 5 Contaminant Information Sheet

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                           |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 31               | ATSDR. 2012. Toxicological Profile for Phosphate Ester Flame Retardants. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                     |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.         |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922).  |
| 153              | Occurrence of anthropogenic organic compounds and nutrients in source and finished water in the Sioux Falls area, South Dakota, 2009–10: U.S. Geological Survey Scientific Investigations Report 2012–5098, 21 p. plus appendixes.                                                                       |
| 155              | Padhye, L.P., Yao, H., Kung'u, F.T., and Huang, C.H. Year-long evaluation on the occurrence and fate of pharmaceuticals, personal care products, and endocrine disrupting chemicals in an urban drinking water treatment plant. 2014. <i>Water Research</i> 51 (2014) 266-276.                           |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.         |
| 304              | USEPA. 2009. Provisional Peer-Reviewed Toxicity Values for Tris(2-chloroethyl)phosphate (TCEP) (CASRN 115-96-8). U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH. |

**Tungsten**

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**CONTAMINANT IDENTIFYING INFORMATION**

|                 |                                         |
|-----------------|-----------------------------------------|
| Name:           | Tungsten                                |
| CASRN:          | 7440-33-7                               |
| DTXSID:         | <a href="#">DTXSID8052481</a>           |
| Use:            | Metal, in plating material and textiles |
| Chemical Notes: |                                         |

| Is the contaminant on any lists?                  |  |
|---------------------------------------------------|--|
| CERCLA                                            |  |
| FIFRA                                             |  |
| Human Neurotoxicants                              |  |
| PubMed Neurotoxicants                             |  |
| Neurodev. Disruptors                              |  |
| Androgen Receptors in vitro                       |  |
| Compounds with neurodev effects, Mundy et al 2015 |  |

**CONTAMINANT SUMMARY & DECISION**

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 0.8                        |

**ATTRIBUTE SCORE & FINAL HAZARD QUOTIENT INFORMATION**

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects | 10         | 6         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                          | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|------------------------------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 5                      | glandular stomach goblet cell metaplasia | general population | PPRTV             | 2015                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 3.99                         | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

**PUBLIC NOMINATION STATUS**

| Public Nomination |
|-------------------|
|                   |

**PAST CCL STATUS**

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

**PAST NEGATIVE REGULATORY DETERMINATION STATUS**

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |
| Basis          |                |                |

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Tungsten

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source | Critical Study       | Critical Effect                          | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|-------------------|----------------------|------------------------------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0008 | mg/kg/day | PPRTV 2015        | USACHPPM 2007a and b | glandular stomach goblet cell metaplasia | general population | 33.8                        | 4.73       | [356]                    |       |
| Cancer Classification (CC)         | I      |           | PPRTV 2015        |                      |                                          |                    |                             |            | [356]                    |       |
|                                    |        |           | ATSDR 2005        |                      |                                          |                    |                             |            | [25]                     |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Immune, Renal, Hematologic  | 17.7                        | Frawley, 2016      | Respiratory, Systemic        | 284                          | Frawley, 2016       | 2014-09-01           | 2020-01-21         | 805                                            | 2                                               | 29                                             | 2                                                 |

## Other Health Data

| Data Element                                | Value | Units     | Source    | Notes |
|---------------------------------------------|-------|-----------|-----------|-------|
| <b>Measured Data and Assessment Results</b> |       |           |           |       |
| Subchronic Provisional RfD                  | 0.008 | mg/kg/day | EPA PPRTV |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units | Source | Notes |
|---------------------------------------------|-------|-------|--------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |        |       |
|                                             |       |       |        |       |

| Data Element             | Value | Units | Source    | Notes |
|--------------------------|-------|-------|-----------|-------|
| <b>Modeled Data</b>      |       |       |           |       |
| LD50                     |       |       | TEST QSAR |       |
| Ames mutagenicity test   |       |       | TEST QSAR |       |
| Developmental toxin test |       |       | TEST QSAR |       |

## Tungsten

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 21                                  | 17                   | Sites                 | 81                      | 0.06                       | 0.376                     | 3.99                         | 22.1                       | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 4                                   | 3                    | Sites                 | 75                      | 0.1                        | 0.7                       | 1.88                         | 2.3                        | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 17                                  | 14                   | Sites                 | 82                      | 0.06                       | 0.376                     | 4.4                          | 22.1                       | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) | 10M - 50M                    |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                          |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 82                                  | 49                   | Sites                  | 60                      | 0.003                      | 1.04                      | 3.01                         | 42.2                       | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 1,175                               | 722                  | Sites                  | 61                      | 0.001                      | 0.232                     | 8.32                         | 5060                       | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 1,257                               | 771                  | Sites                  | 61                      | 0.001                      | 0.26                      | 5.9                          | 5060                       | ug/L        |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                   |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Estimated Concentration in Water                              | Date        | Source                              | Value                | Units                  | Model                   | Notes                      |                           |                              |                            |             |       |
|                                                               |             |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expcast exposure                                   |      |                                               |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) | 0.263                           | ug/l  |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.



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| Reference Number | Full Reference                                                                                                                                                                                                                                                                 |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 25               | ATSDR. 2005. Toxicological Profile for Tungsten. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                   |
| 356              | USEPA. 2015. Provisional Peer-Reviewed Toxicity Values for Soluble Tungsten Compounds. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH. |

## Vanadium

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                                                                                            |
|-----------------|--------------------------------------------------------------------------------------------|
| Name:           | Vanadium                                                                                   |
| CASRN:          | 7440-62-2                                                                                  |
| DTXSID:         | <a href="#">DTXSID2040282</a>                                                              |
| Use:            | Use data are for vanadium pentoxide: Chemical intermediate; catalyst;; naturally-occurring |
| Chemical Notes: |                                                                                            |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            | X |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| List                     | 31                         |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 7       | non-cancer effects | 10         | 7         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect   | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-------------------|--------------------|-------------------|----------------------|
| HRL                                                      | 0.4                    | "kidney toxicity" | general population | PPRTV             | 2009                 |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 12.4                         | 90th Percentile                               | Finished Water                       | UCMR3  | 2013-2015 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
| X     | X     | X     | X     |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

## Basis

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Vanadium

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element                       | Value  | Units     | Assessment Source        | Critical Study      | Critical Effect   | Target Population  | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|------------------------------------|--------|-----------|--------------------------|---------------------|-------------------|--------------------|-----------------------------|------------|--------------------------|-------|
| Reference Dose (RfD) or Equivalent | 0.0007 | mg/kg/day | PPRTV 2009               | Boscolo et al. 1994 | "kidney toxicity" | general population | 33.8                        | 0.414      | [305]                    |       |
| Cancer Classification (CC)         | I      |           | PPRTV 2009<br>ATSDR 2012 |                     |                   |                    |                             |            | [305]<br>[32]            |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |                            |                          |       |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
| Neurological                | 38.51                       | Sun, 2017          | Hepatic, Renal               | 83.7                         | Wang, 2016          | 2011-09-01           | 2019-10-22         | 1233                                           | 19                                              | 53                                             | 2                                                 |

## Other Health Data

| Data Element                                | Value  | Units             | Source                         | Notes |
|---------------------------------------------|--------|-------------------|--------------------------------|-------|
| <b>Measured Data and Assessment Results</b> |        |                   |                                |       |
| Acute inhalation Minimal Risk Level (MRL)   | 0.0008 | mg/m <sup>3</sup> | CDC ATSDR                      |       |
| Benchmark                                   | 0.015  | mg/L              | CalEPA OEHHA Chemical Database |       |
| Chronic Health-Based Guidance Value         | 0.05   | mg/L              | MN DOH                         |       |
| Chronic inhalation Minimal Risk Level (MRL) | 0.0001 | mg/m <sup>3</sup> | CDC ATSDR                      |       |
| Intermediate Minimal Risk Level (MRL)       | 0.01   | mg/kg/day         | CDC ATSDR                      |       |
| Subchronic Provisional RfD                  | 0.0007 | mg/kg/day         | EPA PPRTV                      |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                | Value | Units | Source   | Notes |
|---------------------------------------------|-------|-------|----------|-------|
| <b>Measured Data and Assessment Results</b> |       |       |          |       |
| LD50                                        | 2000  | mg/kg | NIH HSDB | max   |
| LD50                                        | 23    | mg/kg | NIH HSDB | min   |

| Data Element             | Value | Units | Source    | Notes |
|--------------------------|-------|-------|-----------|-------|
| <b>Modeled Data</b>      |       |       |           |       |
| LD50                     |       |       | TEST QSAR |       |
| Ames mutagenicity test   |       |       | TEST QSAR |       |
| Developmental toxin test |       |       | TEST QSAR |       |

Technical Support Document for the  
Draft Fifth Contaminant Candidate List (CCL 5)  
Contaminant Information Sheets

EPA 815-R-21-006  
July 2021

EPA - Office of Water

Vanadium  
CCL 5 Contaminant Information Sheet  
OCCURRENCE DATA

EPA-OGWDW and OST

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Scoring Data

| Nationally Representative Water Data                           | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------|-------------------|--------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 | 4,922                         | 3,625             | Sites              | 74                   | 0.2                     | 1.3                    | 12.4                      | 193                     | ug/L        |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 | 989                           | 146               | Sites              | 15                   | 3                       | 7                      | 23                        | 70                      | ug/L        |       |
| <b>Ambient Water</b>                                           |             |                               |                   |                    |                      |                         |                        |                           |                         |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 5,985                         | 4,753             | Sites              | 79                   | 0.02                    | 1.5                    | 8.8                       | 294                     | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 274                           | 176               | Sites              | 64                   | 0.04                    | 1.5                    | 5.9                       | 54.8                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 5,711                         | 4,577             | Sites              | 80                   | 0.02                    | 1.4                    | 17.5                      | 294                     | ug/L        |       |

| Pesticide Application Data                         | Number of States | Amount Applied (lbs/year) | Date | Toxic Release Data                                 | Number of States | Amount Released (lbs/year) | Chemical Production Data                           | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|---------------------------|------|----------------------------------------------------|------------------|----------------------------|----------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                           |      | Toxic Release Inventory (TRI) Program (EPA) (2016) | 12               | 692,638                    | Chemical Data Reporting (CDR) Results (EPA) (2016) | 10M - 50M                    |

Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date        | Number of PWS/ Sites/ Samples | Number of Detects | PWS/ Sites/ Samples | Percent with Detects | Minimum Conc. (Detects) | Median Conc. (Detects) | 90th Percentile (Detects) | Maximum Conc. (Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|-------------|-------------------------------|-------------------|---------------------|----------------------|-------------------------|------------------------|---------------------------|-------------------------|-------------|-------|
| <b>Finished Water</b>                                         |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Finished)                | 2006 - 2020 | 213                           | 123               | Sites               | 58                   | 0.844                   | 5                      | 12                        | 76                      | ug/L        |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012 | 25                            | NA                | Sites               | 16                   |                         | 3.4                    |                           | 4.9                     | ug/L        |       |
| Community Water System Survey (CWSS) (Finished) [178]         | 2006        | 3                             | NA                | Sites               |                      |                         | 2.225                  | 4.1                       |                         | ug/L        |       |
| <b>Ambient Water</b>                                          |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| Drinking Water Monitoring Data - CA (Source)                  | 2006 - 2020 | 1,704                         | 1,279             | Sites               | 75                   | 0.0044                  | 6.68                   | 26                        | 262                     | ug/L        |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017 | 1,056                         | 964               | Sites               | 91                   | 0.01                    | 1.8                    | 8.3                       | 801                     | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017 | 5,214                         | 3,986             | Sites               | 76                   | 0.01                    | 3.7                    | 27.2                      | 1000                    | ug/L        |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017 | 6,258                         | 4,941             | Sites               | 79                   | 0.01                    | 2.4                    | 17.7                      | 1000                    | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012 | 25                            | NA                | Sites               | 44                   |                         | 2.3                    |                           | 5.8                     | ug/L        |       |
| Arnold et al. 2016 (Filtered) [7]                             | 2012 - 2013 | 757                           | 510               | Sites               | 67                   | 0.08                    | 0.48                   | 13                        | 62.3                    | ug/L        |       |
| <b>Waste Water Effluent</b>                                   |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b> | <b>Source</b>                 | <b>Value</b>      | <b>Units</b>        | <b>Model</b>         | <b>Notes</b>            |                        |                           |                         |             |       |
|                                                               |             |                               |                   |                     |                      |                         |                        |                           |                         |             |       |

| Predicted Exposure Data (EPA CompTox Dashboard) | Date | Total Predicted Exposure (mg/kg bw/day) | Notes |
|-------------------------------------------------|------|-----------------------------------------|-------|
| Expocast exposure                               |      |                                         |       |

| Biomonitoring Data                                  | Detection at 90th Percentile | Units | Notes |
|-----------------------------------------------------|------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                              |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                              |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

**Vanadium**

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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7                | Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <a href="http://dx.doi.org/10.3133/ds997">http://dx.doi.org/10.3133/ds997</a> . |
| 32               | ATSDR. 2012. Toxicological Profile for Vanadium. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.                                                                                                                                                                                                                                       |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. Science of The Total Environment. v581-582, (909-922).                                                                                                                                    |
| 178              | USEPA (US Environmental Protection Agency). (2009). 2006 Community Water System Survey. Overview, 57.                                                                                                                                                                                                                                                                                                                              |
| 305              | USEPA. 2009. Provisional Peer-Reviewed Toxicity Values for Vanadium and Its Soluble Inorganic Compounds Other Than Vanadium Pentoxide (CASRN 7440-62-2 and Others), Derivation of Subchronic and Chronic Oral RfDs. EPA/690/R-09/070F. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Superfund Health Risk Technical Support Center, Cincinnati, OH.     |

## Verapamil

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## CONTAMINANT IDENTIFYING INFORMATION

|                 |                               |
|-----------------|-------------------------------|
| Name:           | Verapamil                     |
| CASRN:          | 52-53-9                       |
| DTXSID:         | <a href="#">DTXSID9041152</a> |
| Use:            | Anti-arrhythmia agent         |
| Chemical Notes: |                               |

| Is the contaminant on any lists?                  |   |
|---------------------------------------------------|---|
| CERCLA                                            |   |
| FIFRA                                             |   |
| Human Neurotoxicants                              |   |
| PubMed Neurotoxicants                             | X |
| Neurodev. Disruptors                              |   |
| Androgen Receptors in vitro                       |   |
| Compounds with neurodev effects, Mundy et al 2015 |   |

## CONTAMINANT SUMMARY &amp; DECISION

| Draft CCL5 List Decision | Final Hazard Quotient (HQ) |
|--------------------------|----------------------------|
| Not List                 | 0.00038                    |

## ATTRIBUTE SCORE &amp; FINAL HAZARD QUOTIENT INFORMATION

| Potency | Severity           | Prevalence | Magnitude |
|---------|--------------------|------------|-----------|
| 6       | non-cancer effects | 4          | 1         |

| Health Reference Level (HRL) or CCL Screening Level (SL) | HRL or SL value (ug/L) | Critical Effect                                     | Target Pop.        | Assessment Source | Assessment Pub. Date |
|----------------------------------------------------------|------------------------|-----------------------------------------------------|--------------------|-------------------|----------------------|
| SL                                                       | 5                      | lowest therapeutic dose: management of hypertension | bottle-fed infants | FDA; NIH          | 2018; 2018           |

| Conc. in water for HQ (ug/L) | 90th Percentile or Maximum (if measured conc) | Finished or Ambient (FW, SW, GW, WW) | Source | Date      |
|------------------------------|-----------------------------------------------|--------------------------------------|--------|-----------|
| 0.001886                     | 90th Percentile                               | All Ambient Water                    | NAWQA  | 1991-2017 |

## PUBLIC NOMINATION STATUS

| Public Nomination |
|-------------------|
|                   |

## PAST CCL STATUS

| CCL 1 | CCL 2 | CCL 3 | CCL 4 |
|-------|-------|-------|-------|
|       |       |       |       |

## PAST NEGATIVE REGULATORY DETERMINATION STATUS

| RD 1           | RD 2           | RD 3           |
|----------------|----------------|----------------|
| Not Applicable | Not Applicable | Not Applicable |

## Basis

Not Applicable

Notes: The final hazard quotient is the ratio of the contaminant's concentration in water to its Health Reference Level (HRL) or CCL Screening Level.

The HRL or CCL Screening Level for carcinogens is equivalent to the one-in-a-million cancer risk expressed as a drinking water concentration. For non-carcinogens, the toxicity value (RfD or equivalent) is divided by an exposure factor (i.e. drinking water intake level) relevant to the target population and critical effect and multiplied by a Relative Source Contribution of 20%.

## Verapamil

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## HEALTH EFFECTS DATA

## Qualifying Assessments, Exposure Factors, and HRL Determination

| Data Element | Value | Units | Assessment Source | Critical Study | Critical Effect | Target Population | Exposure Factor (mL/kg-day) | HRL (ug/L) | Assessment Full Citation | Notes |
|--------------|-------|-------|-------------------|----------------|-----------------|-------------------|-----------------------------|------------|--------------------------|-------|
|              |       |       |                   |                |                 |                   |                             |            |                          |       |

## Non-Qualifying Assessments, Exposure Factors, and CCL Screening Level Determinations

| Data Element                       | Value   | Units     | Assessment Source  | Critical Study            | Critical Effect                                    | Target Population  | Exposure Factor (mL/kg-day) | CCL Screening Level (ug/L) | Assessment Full Citation | Notes                                                                                                                 |
|------------------------------------|---------|-----------|--------------------|---------------------------|----------------------------------------------------|--------------------|-----------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Reference Dose (RfD) or Equivalent | 0.00075 | mg/kg/day | FDA 2018; NIH 2018 | Ranbaxy Laboratories Inc. | lowest therapeutic dose:management of hypertension | bottle-fed infants | 151                         | 0.993                      | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |
| Reference Dose (RfD) or Equivalent | 0.00075 | mg/kg/day | FDA 2018; NIH 2018 | Ranbaxy Laboratories Inc. | lowest therapeutic dose:management of hypertension | general population | 33.8                        | 4.44                       | [77] [150]               | NOTE: (Lowest Therapeutic Dose/3000x UF) is used in place of an RfD; LTDs were obtained from FDA-approved drug labels |

## Literature Search Summary

| Lowest LOAEL Health Effects | Lowest LOAEL (mg/kg bw/day) | Lowest LOAEL Study | Highest NOAEL Health Effects | Highest NOAEL (mg/kg bw/day) | Highest NOAEL Study | Start Date of Search | End Date of Search | No. Unique References identified in lit search | No. Animal Studies passed Title-abstract Screen | No. Human Studies passed Title-abstract Screen | No. PECO Relevant Studies passed full-text review |
|-----------------------------|-----------------------------|--------------------|------------------------------|------------------------------|---------------------|----------------------|--------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------|
|                             |                             |                    |                              |                              |                     |                      |                    |                                                |                                                 |                                                |                                                   |

## Other Health Data

| Data Element                                            | Value       | Units | Source              | Notes |
|---------------------------------------------------------|-------------|-------|---------------------|-------|
| <b>Measured Data and Assessment Results</b>             |             |       |                     |       |
| Screening level for pharmaceutical - general population | 0.017647059 | mg/L  | EPA Office of Water |       |
| Screening level for pharmaceutical - infants            | 0.005       | mg/L  | EPA Office of Water |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

The full citation for the critical study is provided in the corresponding health assessment.

PECO = Population, Exposure, Comparator, Outcome.

| Data Element                                     | Value | Units   | Source                  | Notes |
|--------------------------------------------------|-------|---------|-------------------------|-------|
| <b>Measured Data and Assessment Results</b>      |       |         |                         |       |
| LD50                                             | 108   | mg/kg   | NIH HSDB                | min   |
| LD50                                             | 163   | mg/kg   | NIH HSDB                | max   |
| Percent of active toxcast in vitro assays tested | 14.04 | percent | EPA Chemistry Dashboard |       |

| Data Element             | Value     | Units    | Source    | Notes |
|--------------------------|-----------|----------|-----------|-------|
| <b>Modeled Data</b>      |           |          |           |       |
| LD50                     | 0.0010568 | mol/kg   | TEST QSAR |       |
| Ames mutagenicity test   | -0.173    | no units | TEST QSAR |       |
| Developmental toxin test | 0.641     | no units | TEST QSAR |       |

## Verapamil

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## OCCURRENCE DATA

## Scoring Data

| Nationally Representative Water Data                           | Date        | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|----------------------------------------------------------------|-------------|-------------------------------------|----------------------|-----------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                          |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 4               | 2018 - 2019 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 3               | 2013 - 2015 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 2               | 2008 - 2010 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring Rule (UCMR) 1               | 2001 - 2003 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 2   | 1993 - 1997 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| Unregulated Contaminant Monitoring-State (UCM-State) Round 1   | 1988 - 1992 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Inorganics and Radionuclides Survey (NIRS)            | 1984 - 1986 |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| <b>Ambient Water</b>                                           |             |                                     |                      |                       |                         |                            |                           |                              |                            |             |       |
| National Water Quality Assessment (USGS NAWQA) (All Water)     | 1991 - 2017 | 557                                 | 2                    | Sites                 | 0.36                    | 0.00031                    | 0.0013                    | 0.00189                      | 0.00228                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Surface Water) | 1991 - 2017 | 75                                  | 2                    | Sites                 | 2.67                    | 0.00031                    | 0.0013                    | 0.00189                      | 0.00228                    | ug/L        |       |
| National Water Quality Assessment (USGS NAWQA) (Ground Water)  | 1991 - 2017 | 482                                 | 0                    | Sites                 | 0                       |                            |                           |                              |                            |             |       |

| Pesticide Application Data                         | Number of States | Amount Applied<br>(lbs/year) | Date | Toxic Release Data                                    | Number of<br>States | Amount Released<br>(lbs/year) | Chemical Production Data                              | Production Volume (lbs/year) |
|----------------------------------------------------|------------------|------------------------------|------|-------------------------------------------------------|---------------------|-------------------------------|-------------------------------------------------------|------------------------------|
| Estimated Annual Agricultural Pesticide Use (USGS) |                  |                              |      | Toxic Release Inventory (TRI)<br>Program (EPA) (2016) |                     |                               | Chemical Data Reporting (CDR)<br>Results (EPA) (2016) |                              |

## Non-Scoring Data

| Non-Nationally Representative Water Data                      | Date         | Number of<br>PWS/ Sites/<br>Samples | Number of<br>Detects | PWS/ Sites/<br>Samples | Percent with<br>Detects | Minimum Conc.<br>(Detects) | Median Conc.<br>(Detects) | 90th Percentile<br>(Detects) | Maximum Conc.<br>(Detects) | Conc. Units | Notes |
|---------------------------------------------------------------|--------------|-------------------------------------|----------------------|------------------------|-------------------------|----------------------------|---------------------------|------------------------------|----------------------------|-------------|-------|
| <b>Finished Water</b>                                         |              |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Glassmeyer et al 2017 (Finished) [86]                         | 2007 - 2012  | 25                                  | NA                   | Sites                  | 4                       |                            | 0.0267                    |                              | 0.0267                     | ug/L        |       |
| <b>Ambient Water</b>                                          |              |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (Surface Water) | 2008 - 2017  | 210                                 | 9                    | Sites                  | 4.29                    | 4.00E - 04                 | 0.0184                    | 0.0541                       | 0.161                      | ug/L        |       |
| National Water Information System (USGS NWIS) (Groundwater)   | 2008 - 2017  | 401                                 | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| National Water Information System (USGS NWIS) (All Water)     | 2008 - 2017  | 611                                 | 9                    | Sites                  | 1.47                    | 4.00E - 04                 | 0.0184                    | 0.0541                       | 0.161                      | ug/L        |       |
| Glassmeyer et al 2017 (Ambient) [86]                          | 2007 - 2012  | 25                                  | NA                   | Sites                  | 4                       |                            | 0.0459                    |                              | 0.0459                     | ug/L        |       |
| Batt et al. 2016 (Ambient) [46]                               | 2008 - 2009  | 182                                 | 39                   | Sites                  | 21                      | 9e-04                      | 0.0032                    | 0.015                        | 0.0358                     | ug/L        |       |
| Bradley et al. 2017 (Ambient) [52]                            | 2012 - 2014  | 38                                  | 6                    | Sites                  | 16                      | 0.0007812                  | 0.00358                   | 0.0099                       | 0.0129033                  | ug/L        |       |
| Bexfield et al. 2019 (Groundwater) [49]                       | 2013 - 2015  | 1,106                               | 0                    | Sites                  | 0                       |                            |                           |                              |                            |             |       |
| <b>Waste Water Effluent</b>                                   |              |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |
| Scott et al. 2018 (Wastewater) [161]                          | 2011 - 2017  | 21                                  | 12                   | Sites                  | 57                      | 0.0095317                  | 0.0228                    | 0.132                        | 4.119285                   | ug/L        |       |
| Kostich et al. 2014 (Wastewater) [126]                        | not reported | 49                                  | 39                   | Sites                  | 80                      | 0.0053                     | 0.021                     | 0.0502                       | 0.0971                     | ug/L        |       |
| Batt et al. (2008) via Kostich et al. 2010 (Wastewater) [127] | 2010         | NA                                  | NA                   |                        |                         |                            |                           |                              | 0.19                       | ug/L        |       |
| <b>Estimated Concentration in Water</b>                       | <b>Date</b>  | <b>Source</b>                       | <b>Value</b>         | <b>Units</b>           | <b>Model</b>            | <b>Notes</b>               |                           |                              |                            |             |       |
|                                                               |              |                                     |                      |                        |                         |                            |                           |                              |                            |             |       |

| Predicted Exposure Data<br>(EPA CompTox Dashboard) | Date | Total Predicted<br>Exposure (mg/kg<br>bw/day) | Notes |
|----------------------------------------------------|------|-----------------------------------------------|-------|
| Expocast exposure                                  |      | 0.000000276                                   |       |

| Biomonitoring Data                                  | Detection at 90th<br>Percentile | Units | Notes |
|-----------------------------------------------------|---------------------------------|-------|-------|
| NHANES biomonitoring detection in serum (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in blood (1999-2016) |                                 |       |       |
| NHANES biomonitoring detection in urine (1999-2016) |                                 |       |       |

Notes: Highlighted data indicate value was used in attribute scoring.

Blank fields indicate there were no data available.

"All Water" data from NWIS and NAWQA are combined surface water and groundwater data.

Monitoring dates for non-scoring data and NAWQA are not chemical-specific and may not contain samples for all years listed.

State Drinking Water Monitoring Data with a max date range of 2020 may contain few samples from early 2020.

UCMR 4 data used in the draft CCL5 is a partial dataset and will be complete in Dec. 2020.

| Modelled Environmental Fate Parameters<br>(EPA CompTox Dashboard) | Source     | Value       | Units                   | Notes |
|-------------------------------------------------------------------|------------|-------------|-------------------------|-------|
| Biodegradation half-life                                          | OPERA QSAR | 7.28169     | days                    |       |
| Boiling point                                                     | OPERA QSAR | 425.134     | degree C                |       |
| Boiling point                                                     | TEST QSAR  | 489.98      | degree C                |       |
| Vapor pressure                                                    | OPERA QSAR | 6.02E-10    | mmHg                    |       |
| Vapor pressure                                                    | TEST QSAR  | 1.22E-09    | mmHg                    |       |
| Solubility in water                                               | OPERA QSAR | 0.000000569 | mol/L                   |       |
| Solubility in water                                               | TEST QSAR  | 0.000000891 | mol/L                   |       |
| Bioconcentration factor                                           | OPERA QSAR | 200.744     | no units                |       |
| Bioconcentration factor                                           | TEST QSAR  | 197.242     | no units                |       |
| Henry's Law constant                                              | OPERA QSAR | 0.000000428 | atm-m <sup>3</sup> /mol |       |
| Octanol/water partitioning coeff. (log Kow)                       | OPERA QSAR | 3.88495     | no units                |       |



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| Reference Number | Full Reference                                                                                                                                                                                                                                                                                          |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 46               | Batt, A. L., Kincaid, T. M., Kostich, M. S., Lazorchak, J. M., & Olsen, A. R. (2016). Evaluating the extent of pharmaceuticals in surface waters of the United States using a National-scale Rivers and Streams Assessment survey. <i>Environmental toxicology and chemistry</i> , 35(4), 874-881.      |
| 49               | Bexfield, L.M., P.L. Toccalino, K. Belitz, W.T. Foreman, and E.T. Furlong. 2019. Hormones and pharmaceuticals in groundwater used as a source of drinking water across the United States. <i>Environmental Science and Technology</i> 53: 2950-2960.                                                    |
| 52               | Bradley, P. M., Journey, C. A., Romanok, K. M., Barber, L. B., Buxton, H. T., Foreman, W. T., ... & Jones, D. K. (2017). Expanded target-chemical analysis reveals extensive mixed-organic-contaminant exposure in US streams. <i>Environmental science &amp; technology</i> , 51(9), 4792-4802.        |
| 77               | FDA. 2018. Drugs @ FDA: FDA Approved Drug Products. U.S. Food and Drug Administration (FDA). <a href="https://www.accessdata.fda.gov/scripts/cder/daf/">https://www.accessdata.fda.gov/scripts/cder/daf/</a> .                                                                                          |
| 86               | Glassmeyer, S.T., Furlong, E.T., Kolpin, D.W., Batt, A.L., Benson, R., Boone, J.S., ... & Wilson, V.S. (2017). Nationwide reconnaissance of contaminants of emerging concern in source and treated drinking waters of the United States. <i>Science of The Total Environment</i> . v581-582, (909-922). |
| 126              | Kostich MS, et al. 2014 Concentrations of prioritized pharmaceuticals in effluents from 50 large wastewater treatment plants in the US and implications for risk estimation. <i>Environ Pollut</i> . 2014 Jan;184:354-9. doi: 10.1016/j.envpol.2013.09.013. Epub 2013 Oct 3. PMID: 24095705.            |
| 127              | Kostich, MS, et al., 2010. Predicting variability of aquatic concentrations of human pharmaceuticals. <i>Sci. Total Environ</i> . 408 (20), 4504e4510.                                                                                                                                                  |
| 150              | NIH. 2018. DailyMed Database. U.S. National Library of Medicine, National Institutes of Health (NIH). <a href="https://dailymed.nlm.nih.gov/dailymed/">https://dailymed.nlm.nih.gov/dailymed/</a> .                                                                                                     |
| 161              | Scott, T. M., Phillips, P. J., Kolpin, D. W., Colella, K. M., Furlong, E. T., Foreman, W. T., & Gray, J. L. (2018). Pharmaceutical manufacturing facility discharges can substantially increase the pharmaceutical load to US wastewaters. <i>Science of the Total Environment</i> , 636, 69-79.        |

## Appendix B Contaminant Information Sheet References

- [1] Agency for Toxic Substances and Disease Registry (ATSDR). 1993. Toxicological Profile for Aldrin/Dieldrin (update). Atlanta: Agency for Toxic Substances and Disease Registry. 184 pp
- [2] Agency for Toxic Substances and Disease Registry (ATSDR). 1993. Toxicological Profile for Aldrin/Dieldrin (update). Atlanta: Agency for Toxic Substances and Disease Registry. 184 pp.
- [3] Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological Profile for Naphthalene (Update). Atlanta: Agency for Toxic Substances and Disease Registry. 200pp.
- [4] Agency for Toxic Substances and Disease Registry (ATSDR). 1996. Toxicological Profile for 1,1,2,2-Tetrachloroethane. Atlanta, GA: Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services. Available on the Internet at: <http://www.atsdr.cdc.gov/toxprofiles/tp93.html>.
- [5] Alvarez DA, Stackelberg PE, Petty JD, Huckins JN, Furlong ET, Zaugg SD, Meyer MT., 2005. Comparison of a novel passive sampler to standard water-column sampling for organic contaminants associated with wastewater effluents entering a New Jersey stream. *Chemosphere*. 61(5), pp.610-22
- [6] American Conference of Governmental Industrial Hygienists (ACGIH). 1984. Documentation of the Threshold Limit Values for Substances in Workroom Air. Third Edition. Cincinnati, OH: ACGIH. 139 pp.
- [7] Arnold, T.L., DeSimone, L.A., Bexfield, L.M., Lindsey, B.D., Barlow, J.R., Kulongoski, J.T., Musgrove, MaryLynn, Kingsbury, J.A., and Belitz, Kenneth, 2016, Groundwater quality data from the National Water-Quality Assessment Project, May 2012 through December 2013 (ver. 1.1, November 2016): U.S. Geological Survey Data Series 997, 56 p., <http://dx.doi.org/10.3133/ds997>.
- [8] ATSDR. 1992. Toxicological Profile for 1,2,3-Trichloropropane. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.
- [9] ATSDR. 1995. Toxicological Profile for Diethyl Phthalate. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.
- [10] ATSDR. 1995. Toxicological Profile for Polycyclic Aromatic Hydrocarbons. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.
- [11] ATSDR. 1996. Toxicological Profile for Carbon Disulfide. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.
- [12] ATSDR. 1996. Toxicological Profile for Methyl tert-Butyl Ether. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.

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- [13] ATSDR. 1998. Toxicological Profile for Chloromethane. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.
- [14] ATSDR. 1999. Toxicological Profile for Chlorophenols. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.
- [15] ATSDR. 1999. TOXICOLOGICAL PROFILE FOR MERCURY. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.
- [16] ATSDR. 2000. Toxicological Profile for Aldrin/Dieldrin (Update). Atlanta, GA: Agency for Toxic Substances and Disease Registry. 280 pp.
- [17] ATSDR. 2001. Toxicological Profile for Di-n-Butyl Phthalate. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.
- [18] ATSDR. 2002. Toxicological Profile for Aldrin/Dieldrin. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.
- [19] ATSDR. 2004. Toxicological Profile for Ammonia. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.
- [20] ATSDR. 2004. Toxicological Profile for Cobalt. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.
- [21] ATSDR. 2004. Toxicological Profile for Strontium. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.
- [22] ATSDR. 2005. Toxicological Profile for Alpha-, Beta-, Gamma-, and Delta-Hexachlorocyclohexane. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.
- [23] ATSDR. 2005. Toxicological Profile for Naphthalene, 1-Methylnaphthalene, and 2-Methylnaphthalene. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.
- [24] ATSDR. 2005. Toxicological Profile for Tin and Tin Compounds. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.
- [25] ATSDR. 2005. Toxicological Profile for Tungsten. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, GA.

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