United States Environmental Protection Agency

The Fourth Unregulated Contaminant Monitoring Rule (UCMR 4): Data Summary, January 2022

Background

EPA uses the Unregulated Contaminant Monitoring Rule (UCMR) program to collect nationally representative data for contaminants suspected to be present in drinking water, but that do not have regulatory standards. UCMR 4 requires monitoring for 30 chemicals between 2018 and 2020. This monitoring is used by EPA to understand the frequency and level of occurrence of unregulated contaminants in the nation's public water systems (PWSs). Every five years EPA develops a new list of UCMR contaminants, largely based on the Contaminant Candidate List (CCL). The Safe Drinking Water Act (SDWA) calls for EPA to:

- Require monitoring for no more than 30 contaminants per 5-year cycle
- Collect data from large PWSs (i.e., those that serve more than 10,000 people)
- Collect data from a representative sample of small PWSs (i.e., those serving less than or equal to 10,000 people)
- Store analytical results in the National Contaminant Occurrence Database (NCOD)

State and local officials may also use UCMR data to assess the need for actions to protect public health. When evaluating UCMR data, State and local officials should consider the following limitations:

- UCMR monitoring generates a robust national dataset that is representative of occurrence at a national level; it is not designed to be representative of occurrence at a State or local level.
- UCMR results are not available immediately after sample collection. UCMR 4 allows PWSs and the laboratories that support their monitoring up to six months to report results to EPA.
- There is limited information about health effects and treatment techniques to address some of these unregulated contaminants.

This dataset represents the final NCOD release of UCMR 4 analytical results. Before conducting your own assessment of the data, please review the **"Data Considerations"** section**.**

Contaminants and Methods

Contaminant	CAS Registry Number	EPA Method	Contaminant Classification
germanium	7440-56-4	200.8	Metal
manganese	7439-96-5	200.8	Metal
alpha-hexachlorocyclohexane	319-84-6	525.3	Pesticide
chlorpyrifos	2921-88-2	525.3	Pesticide
dimethipin	55290-64-7	525.3	Pesticide
ethoprop	13194-48-4	525.3	Pesticide
oxyfluorfen	42874-03-3	525.3	Pesticide
profenofos	41198-08-7	525.3	Pesticide
tebuconazole	107534-96-3	525.3	Pesticide
total permethrin (cis- & trans-)	52645-53-1	525.3	Pesticide
tribufos	78-48-8	525.3	Pesticide
butylated hydroxyanisole	25013-16-5	530	Semivolatile organic compound
o-toluidine	95-53-4	530	Semivolatile organic compound
quinoline	91-22-5	530	Semivolatile organic compound
1-butanol	71-36-3	541	Alcohol
2-methoxyethanol	109-86-4	541	Alcohol
2-propen-1-ol	107-18-6	541	Alcohol
“total microcystins”	NA	546	Cyanotoxins
microcystin-LA	96180-79-9	544	Cyanotoxin
microcystin-LF	154037-70-4	544	Cyanotoxin
microcystin-LR	101043-37-2	544	Cyanotoxin
microcystin-LY	123304-10-9	544	Cyanotoxin
microcystin-RR	111755-37-4	544	Cyanotoxin
microcystin-YR	101064-48-6	544	Cyanotoxin
nodularin-R	118399-22-7	544	Cyanotoxin
anatoxin-a	64285-06-9	545	Cyanotoxin
cylindrospermopsin	143545-90-8	545	Cyanotoxin
HAA5 (five regulated haloacetic acids)	NA	552.3/557	Disinfection Byproducts
HAA6Br (six brominated haloacetic acids)	NA	552.3/557	Disinfection Byproducts
HAA9 (nine haloacetic acids)	NA	552.3/557	Disinfection Byproducts

Reference Concentrations

EPA has established UCMR 4 Minimum Reporting Levels (MRLs) based on the capability of laboratories to perform the analytical method, not based on a level established as "significant" or "harmful." UCMR 4 results reported at or above those MRLs should be interpreted accordingly. The detection of a UCMR 4 contaminant does not represent cause for concern, in and of itself.

Reference concentrations are health-based and provide context for the detection of a UCMR contaminant. They do not represent regulatory limits or action levels and should not be interpreted as an indication that the Agency intends to establish a future drinking water regulation. UCMR occurrence data will be used to inform the Agency's Regulatory Determination process. Visit EPA's Regulatory Determination website for more information.

Community water systems must inform their consumers of UCMR monitoring results (including the average and range of detections). See 40 CFR 141.153(d)(7) for Consumer Confidence Report (CCR) regulatory requirements and Section IV of EPA's guidance, *"Preparing Your Drinking Water Consumer Confidence Report"* for details on the contents of the report.

Non-transient, non-community water systems required to monitor for UCMR must inform their consumers of the availability of monitoring results. See 40 CFR 141.207 for Tier 3 Public Notice (PN) regulatory requirements and EPA's web page for PN guidance.

Some UCMR 4 contaminants have reference concentrations associated with short-term exposure. Therefore, large PWSs may want to request results for these contaminants early (i.e., before their laboratory posts the results to the UCMR web-based reporting system) so that these PWSs can inform their consumers in a timely manner. EPA manages the laboratory analysis for small PWSs and will work to communicate results in a timely manner.

States may establish requirements for drinking water contaminants not yet regulated by EPA, and those requirements may be based on State-established levels that differ from EPA's reference concentrations. PWSs are responsible for being aware of, and complying with their State's requirements, if any.

Reference Concentration Table

The table below provides MRL and reference concentration information for each contaminant monitored under UCMR 4. When developing the table, EPA followed these principles:

(1) EPA based the reference concentrations on publicly available health information found in the following EPA resources:
   a. 2018 Edition of the Drinking Water Standards and Health Advisories Tables,
   b. CCL 4 Contaminant Information Sheets, and
   c. Human Health Benchmarks for Pesticides (HHBPs).

   The primary sources of the health information used to derive the reference concentrations in the resources referenced above are the products of peer-reviewed assessments from EPA or other governmental agencies. The reference concentrations are subject to change as new health assessments are completed. They are not legally enforceable federal standards.

(2) If health information was available from more than one of the EPA resources listed above, the most recent health information was used for the reference concentrations.

(3) If both (chronic) cancer and non-cancer health endpoints were available from the most recent EPA source, the lower (more conservative) of the two concentrations was used except for oxyfluorfen, a "Group C" possible human carcinogen (per 1986 Cancer Guidelines). As noted in the Regulatory Determination protocol, regulatory decision making for Group C chemicals typically considers the non-cancer health value. Please review the "EPA References" in the table below for additional health effects information.
(4) If non-cancer health effects were the basis for the reference concentration, and both chronic and short-term exposure values were available from the most recent EPA source, the lower concentration (associated with the chronic exposure) was used. In those cases where the chronic and short-term exposure values were the same, both are noted in the table. Please review the "EPA References" in the table below for health effects information (e.g., additional short-term or chronic values).
(5) For chemicals with reference concentrations based on a cancer endpoint, the table presents a range of concentrations associated with risks of 10^{-6} (1 in 1,000,000) to 10^{-4} (1 in 10,000) over a lifetime.
(6) For chemicals with reference concentrations based on a non-cancer endpoint, the exposure duration (short-term, intermediate/long-term, chronic) associated with the toxic effect is shown.

Recognizing that additional health effects information will become available over time, those attempting to assess UCMR occurrence data are encouraged to visit: EPA's Drinking Water Contaminant Human Health Effects Information for the most recent information.

Reference Concentrations

Contaminant	*MRL (µg/L)*	*Reference Concentration (µg/L)*	*Reference Concentration based on a Cancer Endpoint (Y/N)*	*EPA Reference(s)*
germanium[1]	0.3	NA	-	-
manganese[2]	0.4	300	N [chronic and short -term exposure (10-day infants)]	Health Advisory for Manganese
alpha-hexachlorocyclohexane[3,4]	0.01	0.006 to 0.6	Y	CCL 4 Contaminant Information Sheets
chlorpyrifos[5]	0.03	2	N (chronic exposure)	2018 Edition of the Drinking Water Standards and Health Advisories Tables
dimethipin[6]	0.2	140	N (chronic exposure)	Human Health Benchmarks for Pesticides (HHBPs)
ethoprop[4,7]	0.03	1.14 to 114	Y	Human Health Benchmarks for Pesticides (HHBPs)
oxyfluorfen[8]	0.05	200	N (chronic exposure)	Human Health Benchmarks for Pesticides (HHBPs)
profenofos[9]	0.3	0.3	N (chronic exposure)	Human Health Benchmarks for Pesticides (HHBPs)

[1] The CCL 4 Contaminant Information Sheet provides a concentration for this contaminant, but it is based on a single study. Therefore, no reference concentration is provided for UCMR 4.
[2] Mn also has a non-mandatory secondary drinking water standard based on aesthetic factors (taste and color) and staining (plumbing fixtures and laundry).
[3] 10^{-6} cancer risk < MRL < 10^{-4} cancer risk. The MRL was established based on the capability of the analytical method.
[4] Reference concentration range based on cancer risk of 10^{-6} to 10^{-4}.
[5] The Office of Pesticide Programs (OPP) Reregistration Eligibility Decision, 2006 is the basis for the health advisory. Additional OPP health effects information and information on subsequent regulatory actions by the pesticides program is available for chlorpyrifos.
[6] Dimethipin does not currently have any actively registered pesticide products and is not scheduled for review under the registration review program, per the Agency's October 2015 Notice; dimethipin is no longer a registered pesticide under EPA's program.
[7] Additional OPP health effects information is available for ethoprop.
[8] Since oxyfluorfen is classified as Group C (*possible* human carcinogen), and not as Group A (human carcinogen) or Group B (probable human carcinogen), the reference concentration is based on the non-cancer value.
[9] Profenofos is undergoing voluntary cancellation; see the Agency's April 2017 Notice for the cancellation order and see the Agency's April 2017 final decision/case closure. Additional OPP health effects information is available for profenofos.

Contaminant	*MRL (µg/L)*	*Reference Concentration (µg/L)*	*Reference Concentration based on a Cancer Endpoint (Y/N)*	*EPA Reference(s)*
tebuconazole	0.2	190	N [chronic and short-term exposure (1-day children)]	Human Health Benchmarks for Pesticides (HHBPs)
total permethrin[4, 10]	0.04	3.344 to 334.4	Y	Human Health Benchmarks for Pesticides (HHBPs)
tribufos[11]	0.07	0.6	N (chronic exposure)	Human Health Benchmarks for Pesticides (HHBPs)
butylated hydroxyanisole[1]	0.03	NA	-	-
o-toluidine[1,12]	0.007	NA	-	-
quinoline[3,4]	0.02	0.01 to 1	Y	CCL 4 Contaminant Information Sheets
1-butanol	2.0	700	N (chronic exposure)	CCL 4 Contaminant Information Sheets
2-methoxyethanol[1,12]	0.4	NA	-	-
2-propen-1-ol[12] (allyl alcohol)	0.5	35	N (chronic exposure)	CCL 4 Contaminant Information Sheets
"total microcystins" [13,14]	0.3	0.3 (bottle-fed infants and young children); 1.6 (school-age children and adults)	N [Short-term exposure (10-day)]	Drinking Water Health Advisory Documents for Cyanobacterial Toxins
microcystin-LA[14]	0.008	0.3 (bottle-fed infants and young children); 1.6 (school-age children and adults)	N [Short-term exposure (10-day)]	Drinking Water Health Advisory Documents for Cyanobacterial Toxins
microcystin-LF[14]	0.006	0.3 (bottle-fed infants and young children); 1.6 (school-age children and adults)	N [Short-term exposure (10-day)]	Drinking Water Health Advisory Documents for Cyanobacterial Toxins

[10] Additional OPP health effects information is available for total permethrin.

[11] Additional OPP health effects information is available for tribufos.

[12] The support document for EPA's Provisional Peer-Reviewed Toxicity Values (PPRTV) for superfund includes health effects information for this contaminant that is more recent than that used in the development of the CCL 4 Contaminant Information Sheets.

[13] The term "total microcystins" is used in UCMR 4 to represent the results of EPA Method 546. The method uses ELISA to detect the Adda amino acid side chain, which is common to microcystin and nodularin congeners.

[14] EPA's Cyanotoxins in Drinking Water website includes "Recommendations for Public Water Systems to Manage Cyanotoxins in Drinking Water," additional tools and resources.

Contaminant	*MRL (µg/L)*	*Reference Concentration (µg/L)*	*Reference Concentration based on a Cancer Endpoint (Y/N)*	*EPA Reference(s)*
microcystin-LR[14]	0.02	0.3 (bottle-fed infants and young children); 1.6 (school-age children and adults)	N [Short-term exposure (10-day)]	Drinking Water Health Advisory Documents for Cyanobacterial Toxins
microcystin-LY[14]	0.009	0.3 (bottle-fed infants and young children); 1.6 (school-age children and adults)	N [Short-term exposure (10-day)]	Drinking Water Health Advisory Documents for Cyanobacterial Toxins
microcystin-RR[14]	0.006	0.3 (bottle-fed infants and young children); 1.6 (school-age children and adults)	N [Short-term exposure (10-day)]	Drinking Water Health Advisory Documents for Cyanobacterial Toxins
microcystin-YR[14]	0.02	0.3 (bottle-fed infants and young children); 1.6 (school-age children and adults)	N [Short-term exposure (10-day)]	Drinking Water Health Advisory Documents for Cyanobacterial Toxins
nodularin-R[14]	0.005	NA	-	-
anatoxin-a[14,15]	0.03	NA	-	-
cylindrospermopsin[14]	0.09	0.7 (bottle-fed infants and young children); 3 (school-age children and adults)	N [Short-term exposure (10-day)]	Drinking Water Health Advisory Documents for Cyanobacterial Toxins
HAA5[16]	-	60	Y/N (chronic exposure)	The MCL for the National Primary Drinking Water Regulation
HAA6Br[17]	-	NA	-	-
HAA9[18]	-	NA	-	-

[15] The Health Effects Support Document for the Cyanobacterial Toxin Anatoxin-a concluded that the data from the oral toxicity studies evaluated contained too few dose levels and study endpoints to derive a reference dose (RfD).

[16] Since HAA5 is regulated, EPA is using a different authority (Section 1445(a)(1)(A) of SDWA) as the basis for UCMR 4 monitoring. The MCL was based on a consideration of cancer and non-cancer effects. HAA5 = Dibromoacetic Acid, Dichloroacetic Acid, Monobromoacetic Acid, Monochloroacetic Acid, and Trichloroacetic Acid.

[17] HAA6Br = Bromochloroacetic Acid, Bromodichloroacetic Acid, Dibromoacetic Acid, Dibromochloroacetic Acid, Monobromoacetic Acid, and Tribromoacetic Acid.

[18] HAA9 = Bromochloroacetic Acid, Bromodichloroacetic Acid, Chlorodibromoacetic Acid, Dibromoacetic Acid, Dichloroacetic Acid, Monobromoacetic Acid, Monochloroacetic Acid, Tribromoacetic Acid, and Trichloroacetic Acid.

Terms

a) UCMR Reference Concentration = The reference concentrations are based on publicly available health information found in the following EPA resources: 2018 Edition of the Drinking Water Standards and Health Advisories Tables [i.e., Health advisories (HA)], the CCL 4 Contaminant Information Sheets [i.e., Health Reference Levels (HRLs)], and the Human Health Benchmark for Pesticides (i.e., HHBPs). The primary sources of the health information used to derive the guideline values in the resources referenced above are peer-reviewed assessments from EPA or other governmental agencies. The reference concentrations are subject to change as new health assessments are completed. Reference Concentrations are not legally enforceable federal standards.

b) MRL = UCMR Minimum Reporting Level. The minimum concentration that may be reported by a laboratory as a quantified value for a method analyte following analysis. The MRLs were established based on the capability of the analytical method, not based on a level established as "significant" or "harmful." ***[Note that the Agency for Toxic Substances & Disease Registry (ATSDR) uses the term "MRL" for a different purpose (i.e., to describe "Minimal Risk Levels"). The UCMR term and the ATSDR term have no relationship to each other.]***

c) HRL = Health Reference Levels. The CCL process derives HRLs for screening purposes using available data. The CCL HRLs derived from health assessments can be used in the Regulatory Determination process as risk-derived concentrations against which to evaluate the occurrence data to determine if contaminants may occur at levels of public health concern. HRLs are not final determinations about the level of a contaminant in drinking water that is necessary to protect any particular population and, in some cases, are derived prior to development of a complete exposure assessment using the best available data. HRLs are not legally enforceable federal standards.

d) HA = Health Advisories. HAs provide information on contaminants that can cause human health effects and are known or anticipated to occur in drinking water. EPA's health advisories are non-enforceable and non-regulatory and provide technical information to State agencies and other public health officials on health effects, analytical methodologies, and treatment technologies to assist with risk management decisions.

e) HHBP = Human Health Benchmarks for Pesticides. EPA has developed HHBPs for informational purposes for use by States, water systems and the public to assist with risk management decisions and to prioritize monitoring efforts for pesticides that have no drinking water standards or health advisories. All benchmarks for the contaminants on UCMR 4 were calculated with updated exposure assumptions [body weight (80 kg) and drinking water intake (2.5 L/day)]. The HHBPs are not legally enforceable federal standards.

f) MCL = Maximum Contaminant Level. The highest level of a contaminant allowed in drinking water. MCLs are enforceable standards.

g) Cancer Risk of 10^{-6} to 10^{-4} (chronic exposure) = The concentration of a contaminant in drinking water corresponding to an excess estimated lifetime cancer risk of one-in-a-million ($1x\ 10^{-6}$) to one-in-ten thousand (1×10^{-4}). The 2018 Edition of the Drinking Water Standards and Health Advisories Tables provide the cancer risk at 1×10^{-4}. The CCL 4 Contaminant Information Sheets provide the cancer risk at $1x\ 10^{-6}$. The Human Health Benchmarks for Pesticides provide a risk range (10^{-6} to 10^{-4}). Cancer risk is derived using drinking water exposure assumptions, risk level and a cancer slope factor (CSF), a toxicity value for evaluating the probability of an individual developing cancer from exposure to a certain level of a contaminant over a lifetime. Generally, when evaluating risk for health endpoints associated with chronic exposures, averages from multiple measurements (potentially spanning a period of time) are more representative of a lifetime risk than results from a single measurement.

h) Non-cancer (short-term exposure) = Based on a dose, "an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of non-cancer effects after short-term exposure." Short-term exposure typically refers to animal toxicological studies with an exposure duration of days to weeks. One-day is protective for up to 1 day of exposure and is typically based on an animal study with a duration of 7 days or less. Ten-day is protective for up to 10 days of exposure and is typically based on an animal study with a duration of 7 to 30 days. Generally, when communicating risk for health endpoints associated with short-term exposures, a single detection is more relevant.

i) Non-cancer (chronic exposure) = Based on a reference dose (RfD), "an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of non-cancer effects following long-term exposure." Chronic exposure typically refers to animal toxicological studies with an exposure duration of months to years, representing a lifetime exposure in humans. Generally, when evaluating risk for health endpoints associated with chronic exposures, averages from multiple measurements (potentially spanning a period of time) are more representative of a lifetime risk than results from a single measurement.

j) PPRTV = Provisional Peer-Reviewed Toxicity Value. A toxicity value (expressed as mg/kg-day) derived for use in the Superfund Program when a value is not available in EPA's Integrated Risk Information System (IRIS, the first tier in the Superfund hierarchy of human health toxicity values). PPRTVs are derived after a review of the relevant scientific literature using the methods, sources of data and guidance for value derivation used by the EPA IRIS Program. All provisional peer-reviewed toxicity values receive internal review by EPA scientists and external peer review by independent scientific experts.

k) NA = Not Available

January 2022 Data Summary

Contaminant	MRL (µg/L)	Reference Concentration (µg/L)	Total number of results	Number of results ≥MRL	Number of results >Reference Concentration	% of total results >Reference Concentration	Total number of PWSs with results	Number of PWSs with results ≥MRL	Number of PWSs with results >Reference Concentration	% of PWSs with results >Reference Concentration
germanium	0.3	NA	37,965	2,671	- -	- -	5,034	654	- -	- -
manganese	0.4	300	37,963	26,334	198	0.5%	5,034	4,527	106	2.1%
alpha-hexachlorocyclohexane	0.01	0.006 / 0.6[1]	37,287	25	25 / 0[2]	0.07% / 0%[2]	5,028	25	25 / 0[2]	0.5% / 0%[2]
chlorpyrifos	0.03	2	37,291	2	0	0%	5,028	2	0	0%
dimethipin	0.2	140	37,286	5	0	0%	5,028	5	0	0%
ethoprop	0.03	1.14 / 114[1]	37,276	5	0 / 0[2]	0% / 0%[2]	5,028	5	0 / 0[2]	0% / 0%[2]
oxyfluorfen	0.05	200	37,286	7	0	0%	5,028	7	0	0%
profenofos	0.3	0.3	37,287	4	4	0.01%	5,028	4	4	0.08%
tebuconazole	0.2	190	37,286	3	0	0%	5,028	3	0	0%
total permethrin	0.04	3.344 / 334.4[1]	37,291	16	0 / 0[2]	0% / 0%[2]	5,028	13	0 / 0[2]	0% / 0%[2]
tribufos	0.07	0.6	37,269	3	0	0%	5,027	3	0	0%
butylated hydroxyanisole	0.03	NA	37,462	7	- -	- -	5,030	7	- -	- -
o-toluidine	0.007	NA	37,517	117	- -	- -	5,030	86	- -	- -
quinoline	0.02	0.01 / 1[1]	37,466	116	116 / 1[2]	0.3% / 0.003%[2]	5,030	76	76 / 1[2]	1.5% / 0.02%[2]
1-butanol	2.0	700	37,564	308	0	0%	5,029	204	0	0%
2-methoxyethanol	0.4	NA	37,567	82	- -	- -	5,029	65	- -	- -
2-propen-1-ol	0.5	35	37,567	36	0	0%	5,029	26	0	0%
total microcystin	0.3	0.3 / 1.6[3]	35,000	8	8 / 0[2]	0.02% / 0%[2]	3,485	7	7 / 0[2]	0.2% / 0%[2]
microcystin-LA	0.008	0.3 / 1.6[3]	5[4]	1	0 / 0[2]	0% / 0%[2]	5[4]	1	0 / 0[2]	0% / 0%[2]
microcystin-LF	0.006	0.3 / 1.6[3]	5[4]	1	0 / 0[2]	0% / 0%[2]	5[4]	1	0 / 0[2]	0% / 0%[2]
microcystin-LR	0.02	0.3 / 1.6[3]	5[4]	1	0 / 0[2]	0% / 0%[2]	5[4]	1	0 / 0[2]	0% / 0%[2]
microcystin-LY	0.009	0.3 / 1.6[3]	5[4]	0	0 / 0[2]	0% / 0%[2]	5[4]	0	0 / 0[2]	0% / 0%[2]
microcystin-RR	0.006	0.3 / 1.6[3]	5[4]	1	0 / 0[2]	0% / 0%[2]	5[4]	1	0 / 0[2]	0% / 0%[2]
microcystin-YR	0.02	0.3 / 1.6[3]	5[4]	0	0 / 0[2]	0% / 0%[2]	5[4]	0	0 / 0[2]	0% / 0%[2]
nodularin	0.005	NA	5[4]	0	- -	- -	5[4]	0	- -	- -
anatoxin-a	0.03	NA	35,405	132	- -	- -	3,484	50	- -	- -
cylindrospermopsin	0.09	0.7 / 3[3]	35,425	13	1 / 0[2]	0.003% / 0%[2]	3,484	12	1 / 0[2]	0.03% / 0%[2]
HAA5	NA	60	63,484	61,419[5]	1,330[6]	2.1%	4,924	4,834[5]	447[6]	9.1%
HAA6Br	NA	NA	63,443	59,947[5]	- -	- -	4,924	4,771[5]	- -	- -
HAA9	NA	NA	63,432	61,520[5]	- -	- -	4,924	4,840[5]	- -	- -

[1]The first number is the reference concentration for 10^{-6} cancer risk; the second number is the reference concentration for 10^{-4} cancer risk.
[2]Where two results are presented the first number is associated with the first reference concentration; the second number is associated with the second reference concentration.
[3]The first number is the reference concentration for bottle-fed infants and young children; the second number is the reference concentration for school-age children and adults.
[4]Samples for the microcystin congeners (e.g., microcystin-LA) and nodularin-R are only analyzed if the "total microcystins" result is ≥ 0.3 µg/L; thus, there are very few results for the individual congeners and nodularin-R. See FAQ for more information.
[5]The number of results or PWSs with at least one HAA in the group at or above its individual MRL.
[6]The HAA5 results for UCMR 4 are not reflective of the compliance status for a PWS per the Disinfectants and Disinfection Byproducts Rule (D/DBPR). HAA5 compliance for D/DBPR is based on a locational running annual average (LRAA) calculated at each monitoring location.

Data Considerations

Data are presented as tab delimited text files within zip files (see below for descriptions), with field names included in the first row of each file and no text qualifier. EPA suggests importing each field into your choice of software as text. Some of the IDs can otherwise be misinterpreted as long integer field types when they contain alpha characters.

To view results or perform additional analyses, select one of the following zip files from UCMR 4 (2018-2020) Occurrence Data:

- **"UCMR 4 Occurrence Data"** to view ALL the analytical results (i.e., results for all analytes reported by all public water systems to date). Note that we expect the "UCMR4_all.txt" file to become too large to be imported into Excel once the majority of the UCMR 4 results are reported, in which case you can try other applications (e.g., Microsoft Access) or import a subset of the data as described below.
- **"UCMR 4 Occurrence Data by State"** to view ALL the analytical results to date, organized by tribes and states: within that zip file, one text file ("UCMR4_All_Tribes_AK_LA.txt") will have all results for tribal systems as well as for the states of Alaska through Louisiana; another ("UCMR4_All_MA_WY.txt") will have all results for the states of Massachusetts through Wyoming. The results are organized this way to address file size limitations and make data management easier.
- **"UCMR 4 Occurrence Data by Method Classification"** to view ALL analytical results to date for all systems by analytical method. Within that ZIP file you will find individual text files with results organized by method (e.g., a Method 200.8 text file with results for germanium and manganese).

The following text files for the **additional data elements** (i.e., parameters beyond the core 30 UCMR 4 contaminants) are also contained in the above zip files:

- UCMR4_HAA_Indicators.txt - Results for total organic carbon and bromide
- UCMR4_ZipCodes.txt - U.S. Postal Service zip code(s) for all areas served by a PWS
- UCMR4_HAA_AddtlDataElem.txt - Additional data elements for the HAAs: DisinfectantType, DisinfectantResidual and TreatmentInformation
- UCMR4_Cyanotoxin_AddtlDataElem.txt - Additional data elements for the cyanotoxins: DisinfectantType, TreatmentInformation, CyanotoxinBloomOccurrence, CyanotoxinOccurrence, CyanotoxinPossibleBloomTreatment and CyanotoxinPossibleBloomSourceWater

Review Instructions for Using Microsoft Excel to Access UCMR 4 Results for further assistance. Additional reference material is available at EPA's UCMR 4 website.

Data Definitions for Text Files: UCMR4_ALL.txt, UCMR4_All_Tribes_AK_LA.txt, UCMR4_All_MA_WY.txt, UCMR4_*MethodNumber*.txt and UCMR4_HAA_Indicators

Field Name	Definition
PWSID	Public Water System Identification. The code used to identify each PWS. The code begins with the standard 2-character postal State abbreviation or Region code; the remaining 7 numbers are unique to each PWS in the State
PWSName	Name of the Public Water System (PWS)
Size	Size category of the PWS for UCMR, based on retail population as indicated by the Safe Drinking Water Information System (Federal) (SDWIS/FED) as of December 31, 2015: S (≤ 10,000), L (> 10,000)
FacilityID	Public Water System Facility Identification. The 5-digit number for each applicable facility associated with water treatment or delivery
FacilityName	Name of the facility at the PWS
FacilityWaterType	Source of water at the facility: **SW** (surface water), **GW** (ground water), **GU** (ground water under the direct influence of surface water), **MX** (Any combination of: SW, GW and GU)
SamplePointID	Identification code for each sample point location in the PWS
SamplePointName	Name of the sample point for every sample point ID at a PWS
SamplePointType	Sampling Point Type Code: **EP** (entry point to the distribution system), **DS** (distribution system), **SR** (source water – untreated water)
AssociatedFacilityID	Null for UCMR 4, the facility ID of the associated DS location
AssociatedSamplePointID	Null for UCMR 4, the sample point ID of the associated DS location
CollectionDate	Date of sample collection (month, day, year)
SampleID	Identification code for each sample, as defined by the laboratory
Contaminant	The UCMR 4 contaminant being analyzed
MRL	Minimum Reporting Level defined by UCMR 4 in µg/L for the contaminants
Units	µg/L
MethodID	Identification code of the analytical method
AnalyticalResultsSign	Less than (<) the minimum reporting level (MRL) or equal to (=) a numeric value at or above the MRL
AnalyticalResultValue(µg/L)	Numeric value of the analytical result in µg/L for the contaminants, null values represent less than MRL
SampleEventCode	Identification code for each sample event**: SEC1, SEC2, SEC3, SEC4, SEC5, SEC6, SEC7** and **SEC8** for cyanotoxins for SW and GU sources only; **SEA1, SEA2, SEA3** and **SEA4** for the metals, pesticides, alcohols and SVOCs where "SEA1" and "SEA2" represent the first and second sampling period for all water types and "SEA3" and "SEA4" represent the third and fourth sampling period for SW and GU sources only; **SEH1, SEH2, SEH3** and **SEH4** for the HAAs where "SEH1" and "SEH2" represent the first and second sampling period for all water types and "SEH3" and "SEH4" represent the third and fourth sampling period for SW and GU sources only
MonitoringRequirement	AM (Assessment Monitoring)

Field Name	Definition
Region	EPA Region (States): 1 (CT, ME, MA, NH, RI, VT), 2 (NJ, NY, PR (Puerto Rico), VI (Virgin Islands)), 3 (DE, DC, MD, PA, VA, WV), 4 (AL, FL, GA, KY, MS, NC, SC, TN), 5 (IL, IN, MI, MN, OH, WI), 6 (AR, LA, NM, OK, TX), 7 (IA, KS, MO, NE), 8 (CO, MT, ND, SD, UT, WY), 9 (AZ, CA, HI, NV, AS (American Samoa), GU (Guam), MP (Northern Marianas Islands), NN (Navajo Nation)), 10 (AK, ID, OR, WA)
State	State abbreviation; Tribal PWSs without primacy are attributed to an EPA Region (01, 02, 03, 04, 05, 06, 07, 08, 09, 10)
UCMR1SampleType	Null for UCMR 4

Additional Data Definitions for Text File: UCMR4_ZipCodes

Field Name	Definition
ZIPCODE	U.S. Postal Service zip code(s) for all areas being served water by a PWS. This data is entered by the PWS.

Additional Data Definitions for Text File: UCMR4_HAA_AddtlDataElem

Field Name: AdditionalDataElement	Field Name: Response
DisinfectantType	All of the disinfectants/oxidants that have been added prior to the entry point to the distribution system. Please select all that apply. **PEMB** = Permanganate, **HPXB** = Hydrogen peroxide, **CLGA** = Gaseous chlorine, **CLOF** = Offsite Generated Hypochlorite (stored as a liquid form), **CLON** = Onsite Generated Hypochlorite, **CAGC** = Chloramine (formed with gaseous chlorine), **CAOF** = Chloramine (formed with offsite hypochlorite), **CAON** = Chloramine (formed with onsite hypochlorite), **CLDB** = Chlorine dioxide, **OZON** = Ozone, **ULVL** = Ultraviolet light, **OTHD** = Other types of disinfectant/oxidant, **NODU** = No disinfectant/oxidant used
DisinfectantResidual	Disinfectant residual type in the distribution system for each HAA sample. **CL2** = Chlorine (i.e., originating from addition of free chlorine only), **CLO2** = Chlorine dioxide, **CLM** = Chloramines (originating from the addition of chlorine and ammonia or pre-formed chloramines), **CAC** = Chlorine and chloramines (if being mixed from chlorinated and chloraminated water), **NOD** = No disinfectant residual
TreatmentInformation	Treatment information associated with the sample point. Please select all that apply. **CON** = Conventional (non-softening, consisting of at least coagulation/sedimentation basins and filtration), **INF** = In-line filtration, **DFL** = Direct filtration, **SFN** = Softening, **SSF** = Slow sand filtration, **GAC** = Granular activated carbon adsorption (not part of filters in CON, SFN, INF, DFL, or SSF), **POB** = Pre-oxidation with chlorine (applied before coagulation for CON or SFN plants or before filtration for other filtration plants), **RBF** = River bank filtration, **PSD** = Pre-sedimentation, **BIO** = Biological filtration (operated with an intention of maintaining biological activity within filter), **UTR** = Unfiltered treatment for surface water source, **GWD** = Groundwater system with disinfection only, **PAC** = Application of powder activated carbon, **AIR** = Air stripping (packed towers, diffused gas contactors), **MFL** = Membrane filtration, **IEX** = Ionic exchange, **DAF** = Dissolved air floatation, **CWL** = Clearwell/finished water storage without aeration, **CWA** = Clearwell/finished water storage with aeration, **ADS** = Aeration in distribution system (localized treatment), **OTH** = Other types of treatment, **NTU** = No treatment used, **DKN** = Do not know

Additional Data Definitions for Text File: UCMR4_Cyanotoxins_AddtlDataElem

Field Name: AdditionalDataElement	Field Name: Response
CyanotoxinBloomOccurrence	A yes or no answer provided by the PWS for each cyanotoxin sample event. Question: Preceding the finished water sample collection, did you observe an algal bloom in your source waters near the intake? **YES** = if yes, select ALL that apply (**see CyanotoxinBloomOccurrenceDetail**); **NO** = have never seen a bloom; **DK** = do not know; **NA** = purchased consecutive connection (no source water)
CyanotoxinBloomOccurrenceDetail	If yes, select ALL that apply: **YD** = yes, on the day the UCMR cyanotoxin sample was collected, **YW** = yes, between the day the sample was taken and the past week, **YM** = yes, between the past week and past month, **YY** = yes, between the past month and past 12 months, **YP** = yes, more than a year ago
CyanotoxinOccurrence	A yes or no answer provided by the PWS for each cyanotoxin sample event. Question: Preceding the finished water sample collection, were cyanotoxins ever detected in your source waters near the intake and prior to any treatment (based on sampling by you or another party)? **YES** = if yes, select ALL that apply (**see CyanotoxinOccurrenceDetail**); **NO** = have never detected cyanotoxins in source water; **NS** = unaware of any source water cyanotoxin sampling
CyanotoxinOccurrenceDetail	If yes, select ALL that apply: **YD** = yes, on the day the UCMR cyanotoxin sample was collected, **YW** = yes, between the day the sample was taken and the past week, **YM** = yes, between the past week and past month, **YY** = yes, between the past month and past 12 months, **YP** = yes, more than a year ago Select ALL that apply (i.e., all that were detected) if you answered YES to detecting cyanotoxins in source water: **MIC** = Microcystins, **CYL** = Cylindrospermopsin, **ANA** = Anatoxin-A, **SAX** = Saxitoxins, **OTH** = Other (see field name "IfOtherText" for details), **DK** = do not know
CyanotoxinPossibleBloomTreatment	A yes or no answer provided by the PWS for each cyanotoxin sample event. Question: Preceding the finished water sample collection, did you notice any changes in your treatment system operation and/or treated water quality that may indicate a bloom in the source water? **YES =** if yes, select ALL that apply (**see CyanotoxinPossibleBloomTreatmentDetail**); **NO** = no changes observed; **DK** = do not know
CyanotoxinPossibleBloomTreatmentDetail	If yes, select ALL that apply: **DFR** = Decrease in filter runtimes, **ITF** = Increase in turbidity in filtered water, **ICD** = Need for increased coagulant dose, **TOI** = Increase in taste and odor issues in finished water, **IOD** = Need for increase in oxidant/disinfectant dose**, IDB** = Increase in TTHM/HAA5 in finished water, **OTH** = Describe other changes (see field name "IfOtherText" for details)
CyanotoxinPossibleBloomSourceWater	A yes or no answer provided by the PWS for each cyanotoxin sample event. Question: Preceding the finished water sample collection, did you observe any notable changes in source water quality parameters (if measured)? **YES =** if yes, select ALL that apply to the source water (**see CyanotoxinPossibleBloomSourceWaterDetail**); **NO** = no changes observed; **DK** = do not know
CyanotoxinPossibleBloomSourceWaterDetail	If yes, select ALL that apply to the source water: **ITP** = Increase in water temperature, **ITU** = Increase in turbidity, **IAL** = Increase in alkalinity, **ITO** = Increase in total organic carbon, **ICD** = Increase in chlorine demand, **IPH** = Increase in pH and/or **DPH =** Decrease in pH, **ICA** = Increase in chlorophyll a, **IPY** = Increase in phycocyanin, **INU** = Increase in nutrients (example: nitrogen or phosphorus), **OTH** = Describe other changes (see field name "IfOtherText" for details)