The Second Unregulated Contaminant Monitoring Rule (UCMR 2) Data Summary: 2008–2010

Background

The EPA uses the Unregulated Contaminant Monitoring Rule (UCMR) program to collect nationally representative data for contaminants that may be present in drinking water but do not have regulatory standards set under the Safe Drinking Water Act (SDWA). This monitoring is used by the agency to understand the frequency and level of occurrence of unregulated contaminants in the nation's drinking water systems. Every five years, taking into consideration the EPA's Contaminant Candidate List (CCL), the agency develops a new list of UCMR contaminants for monitoring. SDWA calls for the EPA to:

- Issue a list of unregulated contaminants to be monitored by certain public water system (PWS) types[1] every five years
- Require large PWSs (*i.e.*, those that serve more than 10,000 people) to monitor their water for the contaminants
- Require a nationally representative sample of small PWSs serving 10,000 or fewer people to monitor[2]
- Make analytical results available in a National Contaminant Occurrence Database (NCOD) for drinking water

UCMR 2 required monitoring between 2008 and 2010 for the 25 contaminants listed in Table 1. UCMR 2 contaminants were monitored under the UCMR Assessment Monitoring (AM) or Screening Survey (SS) design. For more information, refer to the EPA's UCMR 2 website. Summary details for contaminant occurrence are shown in Table 2 and represent the final release of UCMR 2 analytical results. Before conducting your own assessment of the data, please review the Data Considerations section.

[1] UCMR 2 requirements applied to community water systems (CWSs) and non-transient non-community water systems (NTNCWSs). They did not apply to transient non-community water systems (TNCWSs). The use of "PWS" throughout this document refers to participating CWSs and NTNCWSs. For more information on PWS types, visit the agency's website.

[2] SDWA, as amended by Section 2021 of America's Water Infrastructure Act of 2018, calls for the EPA to require small PWSs serving between 3,300 and 10,000 people to monitor for UCMR contaminants, subject to the availability of EPA appropriations and sufficient laboratory capacity, and to require a nationally representative sample of small PWSs serving fewer than 3,300 people to monitor. This expansion in small PWS monitoring applies to the fifth UCMR (UCMR 5) and subsequent monitoring cycles.

Table 1. Contaminants and Methods

Contaminant	CASRN[1]	EPA Method	Contaminant Classification	Monitoring Requirement[2]
2,2',4,4'-tetrabromodiphenyl ether (BDE-47)	5436-43-1	527	Flame retardant	AM
2,2',4,4',5-pentabromodiphenyl ether (BDE-99)	60348-60-9	527	Flame retardant	AM
2,2',4,4',5,5'-hexabromobiphenyl (HBB)	59080-40-9	527	Flame retardant	AM
2,2',4,4',5,5'-hexabromodiphenyl ether (BDE-153)	68631-49-2	527	Flame retardant	AM
2,2',4,4',6-pentabromodiphenyl ether (BDE-100)	189084-64-8	527	Flame retardant	AM
dimethoate	60-51-5	527	Pesticide	AM
terbufos sulfone	56070-16-7	527	Pesticide	AM
1,3-dinitrobenzene	99-65-0	529	Explosives and related compounds	AM
2,4,6-trinitrotoluene (TNT)	118-96-7	529	Explosives and related compounds	AM
hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	529	Explosives and related compounds	AM
N-nitroso-diethylamine (NDEA)	55-18-5	521	Nitrosamines; disinfection byproducts	SS
N-nitroso-dimethylamine (NDMA)	62-75-9	521	Nitrosamines; disinfection byproducts	SS
N-nitroso-di-n-butylamine (NDBA)	924-16-3	521	Nitrosamines; disinfection byproducts	SS
N-nitroso-di-n-propylamine (NDPA)	621-64-7	521	Nitrosamines; disinfection byproducts	SS
N-nitroso-methylethylamine (NMEA)	10595-95-6	521	Nitrosamines; disinfection byproducts	SS
N-nitroso-pyrrolidine (NPYR)	930-55-2	521	Nitrosamines; disinfection byproducts	SS
acetochlor	34256-82-1	525.2	Pesticide	SS
alachlor	15972-60-8	525.2	Pesticide	SS
metolachlor	51218-45-2	525.2	Pesticide	SS
acetochlor ethane sulfonic acid (ESA)	187022-11-3	535	Pesticide	SS
acetochlor oxanilic acid (OA)	194992-44-4	535	Pesticide	SS
alachlor ethane sulfonic acid (ESA)	142363-53-9	535	Pesticide	SS
alachlor oxanilic acid (OA)	171262-17-2	535	Pesticide	SS
metolachlor ethane sulfonic acid (ESA)	171118-09-5	535	Pesticide	SS
metolachlor oxanilic acid (OA)	152019-73-3	535	Pesticide	SS

[1] CASRN – Chemical Abstracts Service Registry Number

[2] AM – Assessment Monitoring, SS – Screening Survey. For more information on UCMR 2 monitoring design, refer to the EPA's UCMR 2 website.

Information About UCMR 2 Results

The purpose of this document is to summarize and provide additional information about UCMR 2 results.

The UCMR 2 minimum reporting levels (MRLs) are the lowest concentrations that laboratories were permitted to report to the EPA during UCMR 2 monitoring[1]. UCMR MRLs are determined using data from multiple laboratories that participate in the EPA's MRL-setting studies and are not associated with contaminant health effects information. The EPA establishes UCMR MRLs to ensure consistency in the quality of the information reported to the agency.

Community water systems (CWSs) required to monitor under UCMR must inform their customers of UCMR results (including the average and range of results) in their annual Consumer Confidence Report (CCR). See 40 CFR 141.153(d)(7) for the CCR regulatory requirements and Section IV of the EPA's guidance Preparing Your Drinking Water Consumer Confidence Report for details on the content of the report. Additional resources are available on the EPA's CCR Compliance Help webpage.

Non-transient non-community water systems (NTNCWSs) (*e.g.*, a school that operates its own drinking water system) and CWSs required to monitor under UCMR must inform their customers of the availability of UCMR results through Tier 3 Public Notification (PN). See 40 CFR 141.207 for the PN regulatory requirements and the EPA's PN Compliance Help webpage for guidance.

UCMR occurrence data are used to inform the agency's Regulatory Determination process (*i.e.*, the process that addresses potential regulatory actions for unregulated contaminants). State and local officials may also use the UCMR data to assess the need for actions to protect public health. States may establish requirements or levels (regulatory or non-regulatory) for drinking water contaminants not yet regulated by the EPA. PWSs are responsible for being aware of and complying with their state's requirements, if any.

[1] More specifically, an MRL is the quantitation limit for a contaminant that is considered achievable, with 95% confidence, by at least 75% of laboratories nationwide using a specified analytical method (recognizing that individual laboratories may be able to measure at lower levels). Note: The Agency for Toxic Substances and Disease Registry (ATSDR) uses the term "MRL" for a different purpose (*i.e.*, to describe "Minimal Risk Level"). The UCMR term and the ATSDR term have no relationship to each other.

Table 2. UCMR 2 Data Summary[1]

Contaminant	UCMR MRL[2] (µg/L)	Total number of results[3]	Number of results ≥MRL	Total number of PWSs with results[3]	Number of PWSs with results ≥MRL
BDE-47	0.3	32,149	0	4,140	0
BDE-99	0.9	32,149	0	4,140	0
HBB	0.7	32,143	0	4,140	0
BDE-153	0.8	32,139	0	4,140	0
BDE-100	0.5	32,149	0	4,140	0
dimethoate	0.7	32,150	0	4,140	0
terbufos sulfone	0.4	32,149	1	4,140	1
1,3-dinitrobenzene	0.8	32,152	0	4,139	0
TNT	0.8	32,151	0	4,139	0
RDX	1	32,150	4	4,139	3
NDEA	0.005	18,096	46	1,198	26
NDMA	0.002	18,098	1,861	1,198	324
NDBA	0.004	18,101	9	1,198	5
NDPA	0.007	18,107	0	1,198	0
NMEA	0.003	18,101	3	1,198	3
NPYR	0.002	18,101	41	1,198	21
acetochlor	2	11,193	0	1,198	0
alachlor	2	11,193	0	1,198	0
metolachlor	1	11,192	3	1,198	3
acetochlor ESA	1	11,157	2	1,198	2
acetochlor OA	2	11,157	0	1,198	0
alachlor ESA	1	11,156	5	1,198	3
alachlor OA	2	11,157	0	1,198	0
metolachlor ESA	1	11,157	52	1,198	19
metolachlor OA	2	11,157	3	1,198	1

[1] Analytical results from the UCMR program are reported by laboratories and provided by the agency in micrograms/liter (µg/L, or parts per billion). To convert results in µg/L to nanograms/liter (ng/L, or parts per trillion), multiply the value by 1,000. UCMR results are presented as single measurements and do not represent a locational running annual average.

[2] UCMR MRL – EPA-established UCMR Minimum Reporting Level. Based on laboratory capability; not related to contaminant health effects information.

[3] UCMR 2 contaminants were monitored under either the UCMR Assessment Monitoring (AM) or Screening Survey (SS) design, affecting the number of results and PWSs with results for each contaminant. For more information, refer to the EPA's UCMR 2 website. For the nitrosamines, samples were collected at the entry point to the distribution system (EP) and the distribution system at maximum residence time (MR), increasing their total SS results.

Data Considerations

The UCMR 2 analytical results are publicly available through the UCMR Archival Data Finder and as text files.

The UCMR Archival Data Finder allows people to easily search for, summarize, and download the UCMR 2 analytical results. Results can be filtered using multiple data fields, including public water system (PWS), PWS size, state, EPA Region, contaminant, source water type, and results at or above UCMR minimum reporting levels (MRLs) (data definitions provided in Table 3). Selected results can be viewed online or downloaded as a Microsoft Excel file (.xlsx). Additional resources for the UCMR Archival Data Finder are available here.

For those interested in large-scale data processing using statistical or data analysis software, the EPA recommends using the occurrence data text files containing the UCMR 2 analytical results as well as additional information reported during monitoring. Data are provided in tab delimited text files (.txt) (see below for descriptions), with field names included in the first row of each file and no text qualifier. The EPA recommends importing all ID fields into your choice of software (*e.g.*, Microsoft Excel, Microsoft Access) as text since some of the IDs can otherwise be misinterpreted as long integer field types when they contain alpha characters.

- To download the occurrence data text files (data definitions provided in Table 4), select one of the following zip (.zip) files from UCMR 2 (2008-2010) Occurrence Data:
    - **UCMR 2 Occurrence Data Text Files** to view all the analytical results (*i.e.*, results for all contaminants reported by all PWSs). The **UCMR2_All.txt** file may be too large to be imported into Excel, in which case you can try other applications (*e.g.*, Microsoft Access) or import a subset of the data as described below.
    - **UCMR 2 Occurrence Data Text Files by State** to view all the analytical results, organized by Tribes and states. Within that zip file, one text file (**UCMR2_All_Tribes_AK_LA.txt**) will have all results for Tribal PWSs and for the states starting alphabetically with A through L; another file (**UCMR2_All_MA_WY.txt**) will have all results for the states starting alphabetically with M through W. The results are organized this way to address file size limitations and streamline data management.
    - **UCMR 2 Occurrence Data Text Files by Method Classification** to view all the analytical results, organized by analytical method. Within that zip file, you will find individual text files with results organized by method (*e.g.*, a Method 527 file with results for seven contaminants).
- The following text file for **additional data elements** (*i.e.*, information beyond analytical results for the 25 UCMR 2 contaminants) is also contained in each of the above zip files:
    - **UCMR2_Disinfectant_AddtlDataElem.txt** – Disinfectant Type (data definitions provided in Table 5)

For step-by-step details on using the UCMR Archival Data Finder and occurrence data text files, please refer to the document Instructions for Accessing UCMR Results. Additional reference material is available on the EPA's UCMR 2 website.

Table 3. UCMR 2 Data Definitions for the UCMR Archival Data Finder

The data definitions below are specific to the UCMR 2 data. The UCMR Archival Data Finder also contains data from additional UCMR cycles, which may have different definitions for the provided fields. Please refer to the document Instructions for Accessing UCMR Results for data definitions specific to each cycle.

Field Name	Definition
UCMR Cycle	UCMR cycle and monitoring years. Results may have sample collection dates outside the designated UCMR sample collection timeframe (*e.g.*, resample collection): **UCMR 2 (2008–2010)**
PWS ID	Public Water System (PWS) Identification Code. The code used to identify each PWS. The code begins with the standard 2-character postal state abbreviation or Region code for Tribes; the remaining 7 numbers are unique to each PWS in the state. Utah PWS IDs begin with 4 letters (UTAH) followed by 5 numbers
PWS Name	Name of the PWS
Contaminant	The UCMR 2 contaminant analyzed
Result	Numeric value of the analytical result in µg/L for the contaminant. Results less than the UCMR MRL are indicated by **<MRL**
Units	Units of the UCMR MRL and analytical results: **µg/L** (micrograms per liter)
Collection Date	Date of sample collection (month, day, year)
Facility ID	Identification code (5-digit number) for each applicable facility associated with water treatment or delivery at the PWS
Facility Name	Name of the facility at the PWS
Sample Point ID	Identification code for each sample point location at the PWS
Sample Point Name	Name of the sample point at the PWS
Sample Event Code	Identification code for each sample event**:** **SE1**, **SE2**, **SE3**, **SE4**
Sample ID	Identification code for each sample
Method ID	Identification code of the analytical method
PWS Size	Size category of the PWS for UCMR 2, based on total population (retail plus population served by purchasing systems that purchase all of their water) as indicated by the Safe Drinking Water Information System (Federal) (SDWIS/FED) as of June 30, 2005: **S** (≤ 10,000), **L** (> 10,000)
Facility Water Type	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)
Sample Point Type	Sampling Point Type Code: **EP** (entry point to the distribution system), **MR** (distribution system at maximum residence time)
EPA Region	EPA Region (states): **Region 1** (CT, ME, MA, NH, RI, VT), **Region 2** (NJ, NY, PR [Puerto Rico], VI [Virgin Islands]), **Region 3** (DE, DC, MD, PA, VA, WV), **Region 4** (AL, FL, GA, KY, MS, NC, SC, TN), **Region 5** (IL, IN, MI, MN, OH, WI), **Region 6** (AR, LA, NM, OK, TX), **Region 7** (IA, KS, MO, NE), **Region 8** (CO, MT, ND, SD, UT, WY), **Region 9** (AZ, CA, HI, NV, AS [American Samoa], GU [Guam], MP [Northern Marianas Islands], NN [Navajo Nation]), **Region 10** (AK, ID, OR, WA)
State	State abbreviation. Tribal PWSs without primacy are attributed to an EPA Region (01, 05, 06, 08, 09)
Associated Facility ID	Maximum residence time facility ID associated with the entry point facility (SS facilities only)
Associated Sample Point ID	Maximum residence time sample point ID associated with the entry point ID sample point (SS facilities only)
Monitoring Requirement	**AM** (Assessment Monitoring), **SS** (Screening Survey)
Minimum Reporting Level (MRL)	Minimum Reporting Level defined by UCMR 2 in µg/L for the contaminant. Based on laboratory capability; not related to contaminant health effects information
UCMR1 Sample Type	Null for UCMR 2
CASRN	Chemical Abstracts Service Registry Number (CASRN) is a unique identifier assigned by the Chemical Abstracts Service (a division of the American Chemical Society) to every chemical substance (organic and inorganic compounds, polymers elements, nuclear particles, etc.) in the open scientific literature. It contains up to 10 digits, separated by hyphens into three parts
DTXSID	Distributed Structure-Searchable Toxicity Substance Identifier (DTXSID) is a unique substance identifier used in the EPA's CompTox Chemicals database, where a substance can be any single chemical, mixture, or polymer

Table 4. Data Definitions for Text Files: UCMR2All, UCMR2_All_Tribes_AK_LA, UCMR2_All_MA_WY, and UCMR2_*MethodNumber*

Field Name	Definition
PWSID	Public Water System (PWS) Identification Code. The code used to identify each PWS. The code begins with the standard 2-character postal state abbreviation or Region code for Tribes; the remaining 7 numbers are unique to each PWS in the state. Utah PWS IDs begin with 4 letters (UTAH) followed by 5 numbers
PWSName	Name of the PWS
Size	Size category of the PWS for UCMR 2, based on total population (retail plus population served by purchasing systems that purchase all of their water) as indicated by the Safe Drinking Water Information System (Federal) (SDWIS/FED) as of June 30, 2005: **S** (≤ 10,000), **L** (> 10,000)
FacilityID	Identification code (5-digit number) for each applicable facility associated with water treatment or delivery at the PWS
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 at the PWS
SamplePointName	Name of the sample point at the PWS
SamplePointType	Sampling Point Type Code: **EP** (entry point to the distribution system), **MR** (distribution system at maximum residence time)
AssociatedFacilityID	Maximum residence time facility ID associated with the entry point facility (SS facilities only)
AssociatedSamplePointID	Maximum residence time sample point ID associated with the entry point ID sample point (SS facilities only)
CollectionDate	Date of sample collection (month, day, year)
SampleID	Identification code for each sample
Contaminant	The UCMR 2 contaminant analyzed
MRL	Minimum Reporting Level (MRL) defined by UCMR 2 in µg/L for the contaminant. Based on laboratory capability; not related to contaminant health effects information
Units	Units of the UCMR MRL and analytical results: **µg/L** (micrograms per liter)
MethodID	Identification code of the analytical method
AnalyticalResultsSign	Sign indicating whether the analytical result is less than (**<**) the UCMR MRL or equal to (**=**) a numeric value at or above the UCMR MRL
AnalyticalResultValue	Numeric value of the analytical result in µg/L for the contaminant. Null (or blank) values represent results less than the UCMR MRL
SampleEventCode	Identification code for each sample event: **SE1**, **SE2**, **SE3**, **SE4**
MonitoringRequirement	**AM** (Assessment Monitoring), **SS** (Screening Survey)
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, 05, 06, 08, 09)
UCMR1SampleType	Null for UCMR 2

Table 5. Data Definitions for Text File: UCMR2_Disinfectant_AddtlDataElem

Data Element	Definition and Response Options
DisinfectantType	The type of disinfectant in use at the time of UCMR sampling to maintain a residual in the distribution system for each Screening Survey sampling point. To be reported by PWSs required to conduct Screening Survey monitoring. The PWS must report using the following codes for each Screening Survey sampling location (*i.e.*, EP, MR): **CL** = chlorine, **CA** = chloramine, **OT** = all other types of disinfectant (*e.g.*, chlorine dioxide), **ND** = no disinfectant used