The Third Unregulated Contaminant Monitoring Rule (UCMR 3) Data Summary: 2013–2015

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 3 required monitoring between 2013 and 2015 for the 30 contaminants (28 chemicals and two viruses) listed in Table 1a and Table 1b. UCMR 3 chemical contaminants were monitored under the UCMR Assessment Monitoring (AM) or Screening Survey (SS) design; the viruses were monitored under the Pre-Screen Testing (PST) design. For more information, refer to the EPA's UCMR 3 website. Contaminant health effects information that was available at the time of UCMR 3 monitoring is provided in Table 2. The health information presented may no longer be current or publicly available from the original reference. Summary details for contaminant occurrence are shown in Table 3a and Table 3b and represent the final release of UCMR 3 analytical results. Before conducting your own assessment of the data, please review the Data Considerations section.

[1] UCMR 3 requirements applied to community water systems (CWSs) and non-transient non-community water systems (NTNCWSs). For Pre-Screen Testing (PST) monitoring only, transient non-community water systems (TNCWSs) that were sourced by ground water and served 1,000 or fewer people were also subject to being selected for participation. The use of "PWS" throughout this document refers to participating CWSs, NTNCWSs, and TNCWSs. 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 1a. Chemical Contaminants and Methods

Contaminant	CASRN[1]	EPA Method	Contaminant Classification	Monitoring Requirement[2]
chromium (total)	7440-47-3	200.8	Metal	AM
cobalt	7440-48-4	200.8	Metal	AM
molybdenum	7439-98-7	200.8	Metal	AM
strontium	7440-24-6	200.8	Metal	AM
vanadium	7440-62-2	200.8	Metal	AM
chromium-6	18540-29-9	218.7	Metal	AM
chlorate	14866-68-3	300.1	Disinfection byproducts	AM
1,4-dioxane	123-91-1	522	Solvent	AM
1,1-dichloroethane	75-34-3	524.3	Solvent; chemical intermediate	AM
1,2,3-trichloropropane	96-18-4	524.3	Solvent; chemical intermediate	AM
1,3-butadiene	106-99-0	524.3	Industrial chemical	AM
bromochloromethane (Halon 1011)	74-97-5	524.3	Fire extinguishing fluid; chemical intermediate	AM
chlorodifluoromethane (HCFC-22)	75-45-6	524.3	Refrigerant	AM
methyl bromide (bromomethane)	74-83-9	524.3	Pesticide	AM
methyl chloride (chloromethane)	74-87-3	524.3	Industrial chemical	AM
perfluorobutanesulfonic acid (PFBS)	375-73-5	537	Per- and polyfluoroalkyl substances (PFAS)	AM
perfluoroheptanoic acid (PFHpA)	375-85-9	537	PFAS	AM
perfluorohexanesulfonic acid (PFHxS)	355-46-4	537	PFAS	AM
perfluorononanoic acid (PFNA)	375-95-1	537	PFAS	AM
perfluorooctanesulfonic acid (PFOS)	1763-23-1	537	PFAS	AM
perfluorooctanoic acid (PFOA)	335-67-1	537	PFAS	AM
16-α-hydroxyestradiol (estriol)	50-27-1	539	Hormone	SS
4-androstene-3,17-dione	63-05-8	539	Hormone	SS
equilin	474-86-2	539	Hormone	SS
estradiol (17β-estradiol)	50-28-2	539	Hormone	SS
estrone	53-16-7	539	Hormone	SS
ethinyl estradiol (17α-ethynylestradiol)	57-63-6	539	Hormone	SS
testosterone	58-22-0	539	Hormone	SS

[1] CASRN – Chemical Abstracts Service Registry Number

[2] AM – Assessment Monitoring, SS – Screening Survey. For more information on UCMR 3 monitoring design, refer to the EPA's UCMR 3 website.

Table 1b. Microbiological Contaminants and Methods

Contaminant[1]	Method ID	Method Name	Monitoring Requirement[2]
enteroviruses	EPA 1615A	Enterovirus cell culture	PST
enteroviruses	EPA 1615B	Enterovirus RT-qPCR	PST
noroviruses	EPA 1615C	Norovirus genogroup I with RT-qPCR primer set A	PST
noroviruses	EPA 1615D	Norovirus genogroup I with RT-qPCR primer set B	PST
noroviruses	EPA 1615E	Norovirus genogroup II	PST
total coliforms	SM 9223B	Colilert®	PST
E. coli	SM 9223B	Colilert®	PST
Enterococci	ASTM D6503-99	Enterolert®	PST
aerobic spores	SM 9218	Aerobic endospores	PST
male specific phage	EPA 1602	Coliphage in water by single agar layer procedure	PST
somatic phage	EPA 1602	Coliphage in water by single agar layer procedure	PST

[1] Gray rows represent microbial indicators.

[2] PST – Pre-Screen Testing. For more information on UCMR 3 monitoring design, refer to the EPA's UCMR 3 website.

Information About UCMR 3 Results

The purpose of this document is to (1) summarize UCMR 3 results and (2) provide context around UCMR 3 results in relation to EPA-established UCMR minimum reporting levels (MRLs) and, if available, reference concentrations in drinking water.

The UCMR 3 MRLs are the lowest concentrations that laboratories were permitted to report to the EPA during UCMR 3 monitoring. 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.

Depending on the available health and toxicological information for a UCMR 3 contaminant, a reference concentration in drinking water may have been available. The reference concentrations identified in this document do not represent regulatory limits or action levels and should not be interpreted as an indication of future agency actions.

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.

Reference Concentrations

Table 2 provides reference concentrations for chemical contaminants monitored under UCMR 3, if available at the time of monitoring (2013–2015). **Information cited was current as of January 2017** with the publication of the final dataset. Thus, the health information may no longer be current or publicly available from the original reference. Many of the references are hyperlinked to where the most recent information can be found.

To identify reference concentrations, the EPA applied the following principles:

(1) Reference concentrations were based on the following publicly available resources:
   a. 2012 Drinking Water Standards and Health Advisories,
   b. CCL 4 Contaminant Information Sheets,
   c. 2013 Human Health Benchmarks for Pesticides (HHBPs),
   d. Integrated Risk Information System (IRIS) Assessments, and
   e. 2014 Preliminary Regulatory Determinations for Contaminants on CCL 3

   The above resources are the products (or compilation) of peer-reviewed health assessments. 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 resources listed above, the most recent health information was used.

(3) If both cancer and non-cancer reference concentrations were available from the most recent resource, the lower (more conservative) of the two concentrations was used.

(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 resource, the lower concentration (associated with the chronic exposure) was used.

(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.

Please review the references and footnotes in Table 2 for additional health effects information. Recognizing that additional health effects information will become available over time, those attempting to assess UCMR occurrence data are encouraged to visit the EPA's Non-Regulatory Health-Based Drinking Water Levels webpage for the most recent information.

Table 2. UCMR Minimum Reporting Levels (MRLs) and Reference Concentrations at the Time of Monitoring (2013–2015)

Chemical Contaminant	UCMR MRL (µg/L)	Reference Concentration (µg/L)[1]	Reference Concentration based on a Cancer Endpoint (Y/N)[1]	EPA References[1]
chromium (total)	0.2	100	N (chronic exposure)	The MCL for the National Primary Drinking Water Regulation
cobalt	1	70	N (intermediate exposure)	Contaminant Information Sheets for the Final CCL 4
molybdenum[2]	1	40	N (chronic exposure)	2012 Edition of the Health Advisories Table
strontium[3]	0.3	1,500	N (chronic exposure)	Federal Register Notice for the Preliminary Regulatory Determinations for Contaminants on CCL 3
vanadium[4]	0.2	21	N (intermediate exposure)	Contaminant Information Sheets for the Final CCL 4
chromium-6[5]	0.03	-	-	-
chlorate	20	210	N (chronic exposure)	Contaminant Information Sheets for the Final CCL 4
1,4-dioxane[6]	0.07	0.35 to 35	Y	2012 Edition of the Health Advisories Table
1,1-dichloroethane[6]	0.03	6.14 to 614	Y	Contaminant Information Sheets for the Final CCL 4
1,2,3-trichloropropane[6,7,8]	0.03	0.0004 to 0.04	Y	2009 Integrated Risk Information System (IRIS) Assessment
1,3-butadiene[6,7]	0.1	0.0103 to 1.03	Y	Contaminant Information Sheets for the Final CCL 4
Halon 1011[9]	0.06	90	N (chronic exposure)	2012 Edition of the Health Advisories Table
HCFC-22[10]	0.08	-	-	-
bromomethane	0.2	140	N (chronic exposure)	2013 Human Health Benchmarks for Pesticides (HHBPs)
chloromethane[6]	0.2	2.69 to 269	Y	Contaminant Information Sheets for the Final CCL 4

[1] The health information reflects what was available during UCMR 3 monitoring (2013–2015). Information cited was current as of January 2017 with the publication of the final dataset. Thus, the health information may no longer be current or publicly available from the original reference. Many of the references are hyperlinked to where the most recent information can be found.

[2] The 2012 Edition of the Health Advisories Table (40 µg/l) and the CCL 4 Contaminant Information Sheets (35 µg/L) have slightly different reference values for molybdenum due to rounding.

[3] The reference concentration is based on the HRL cited in the preliminary regulatory determination for strontium [Docket No. EPA-HQ-OW-2012-0155].

[4] The assessment for the 1992 Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Level used for vanadium in the CCL 4 Contaminant Information Sheets is no longer publicly available and has been replaced by a new assessment (ATSDR, 2012). The ATSDR Minimal Risk Level (reference dose equivalent) was 0.003 mg/kg/day for minor renal effects in an animal study (ATSDR, 1992) compared to 0.01 mg/kg/day for lack of minor effects in blood pressure, body weight, and hematological parameters in a human study with a 12-week exposure (ATSDR, 2012).

[5] In process/draft EPA Integrated Risk Information System (IRIS) assessment for chromium-6.

[6] Reference Concentration range based on cancer risk of 10^{-6} to 10^{-4}.

[7] 10^{-6} cancer risk < MRL < 10^{-4} cancer risk. The MRL was established based on the capability of the analytical method at the time of monitoring (2013–2015).

[8] To derive the reference concentration, age dependent adjustment factors were applied to the IRIS oral slope factor of 30 per mg/kg-day (calculated using adult exposure data) to address presumed early-life susceptibility for 1,2,3-trichloropropane (see the EPA's Guidelines for Carcinogen Risk Assessment).

[9] The 2012 Edition of the Health Advisories Table (90 µg/L) and the CCL 4 Contaminant Information Sheets (70 µg/L) have slightly different reference values for Halon 1011 due to rounding.

[10] The CCL 4 Contaminant Information Sheets provide a reference level of 31.5 µg/L for HCFC-22; the number is based on a single LOAEL (lowest-observed-adverse-effect level) from a 1983 study.

Chemical Contaminant	UCMR MRL (µg/L)	Reference Concentration (µg/L)[1]	Reference Concentration based on a Cancer Endpoint (Y/N)[1]	EPA References[1]
PFBS	0.09	-	-	-
PFHpA	0.01	-	-	-
PFHxS	0.03	-	-	-
PFNA	0.02	-	-	-
PFOS	0.04	0.07	N (chronic exposure)	2009 Provisional Health Advisory and Supporting Documentation for PFOS
PFOA	0.02	0.07	N (chronic exposure)	2009 Provisional Health Advisory and Supporting Documentation for PFOA
estriol	0.0008	0.35	N (chronic exposure)	Contaminant Information Sheets for the Final CCL 4
4-androstene-3,17-dione	0.0003	-	-	-
equilin	0.004	0.35	N (chronic exposure)	Contaminant Information Sheets for the Final CCL 4
17β-estradiol[6]	0.0004	0.0009 to 0.09	Y	Contaminant Information Sheets for the Final CCL 4
estrone	0.002	0.35	N (chronic exposure)	Contaminant Information Sheets for the Final CCL 4
17α-ethynylestradiol	0.0009	0.035	N (chronic exposure)	Contaminant Information Sheets for the Final CCL 4
testosterone	0.0001	-	-	-

Terms and Definitions

a) **UCMR MRL** – EPA-established UCMR Minimum Reporting Level. The lowest concentration that laboratories may report to the EPA during UCMR 3 monitoring. MRLs are not associated with health effects information. 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.]**

b) **Ref Conc** – Reference Concentration. Based on publicly available health information found in the following EPA resources: 2012 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 2013 Human Health Benchmarks for Pesticides (*i.e.*, HHBPs). These reference concentrations are derived from peer-reviewed health assessments published by the EPA or other governmental agencies. They are not legally enforceable federal standards and are subject to change as new health assessments are completed. Depending on available health effects information, a reference concentration in drinking water can be derived from a reference dose (*i.e.*, a non-cancer endpoint) or a cancer slope factor (CSF) (*i.e.*, a cancer endpoint), and considers additional assumptions about body weight and drinking water intake.

c) **HA** – Health Advisory. Provides information on a contaminant that can cause negative human health effects and is known or anticipated to occur in drinking water. SDWA authorizes the EPA to issue HAs for contaminants that are not subject to a National Primary Drinking Water Regulation (NPDWR). The EPA's HAs are non-enforceable and non-regulatory and provide technical information to state agencies and other public health officials on health effects, analytical methods, and treatment technologies associated with drinking water contaminants. The HA documents include the derivation of the HA levels, which are the concentrations of contaminants at or below which adverse health effects are not anticipated to occur over specific exposure durations, such as one day, 10 days, or a lifetime. The lifetime HA for the drinking water contaminant is calculated from its associated Drinking Water Equivalent Level (DWEL), obtained from its reference dose, and incorporates a drinking water Relative Source Contribution (RSC) factor of contaminant-specific data or a default of 20% of total exposure from all sources.

d) **HRL** – Health Reference Level. Derived during the Contaminant Candidate List (CCL) process for screening purposes. HRLs are used in the EPA's Regulatory Determination process as risk-derived concentrations against which to evaluate occurrence data to determine if contaminants 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. To determine the HRL for a chemical, the agency considers adverse health effects that may pose a greater risk to specific lifestages and other sensitive groups which represent a meaningful portion of the population.

e) **HHBP** – Human Health Benchmarks for Pesticides. The EPA has developed HHBPs for informational purposes for use by states, PWSs, 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. The HHBPs are not legally enforceable federal standards.

f) **MCL** – Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. 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 (1×10^{-6}) to one-in-ten thousand (1×10^{-4}). The 2012 Edition of the Health Advisories provide the cancer risk at 1×10^{-4}. The CCL 4 Contaminant Information Sheets provide the cancer risk at 1×10^{-6}. 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 reference dose, which is a non-cancer 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 deleterious 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 evaluating risk for health endpoints associated with short-term exposures, a single detection is more relevant.

i) **Non-cancer (intermediate/longer-term exposure)** – Based on a reference dose, which is a non-cancer 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 deleterious effects after intermediate/longer-term exposure. Intermediate/longer-term exposure typically refers to animal toxicological studies with an exposure duration of weeks to months.

j) **Non-cancer (chronic exposure)** – Based on a reference dose, which is a non-cancer 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 deleterious effects after 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.

Table 3a. UCMR 3 Data Summary for Chemical Contaminants[1]

Contaminant	UCMR MRL[2] (µg/L)	Ref Conc[3] (µg/L)	Total number of results[4]	Number of results ≥MRL	Number of results >Ref Conc	% of total results >Ref Conc	Total number of PWSs with results[4]	Number of PWSs with results ≥MRL	Number of PWSs with results >Ref Conc	% of PWSs with results >Ref Conc
chromium (total)	0.2	100	62,917	31,773	1	0.002%	4,922	3,660	1	0.02%
cobalt	1	70	62,982	833	3	0.005%	4,922	247	3	0.06%
molybdenum	1	40	62,986	25,377	151	0.2%	4,922	2,546	40	0.8%
strontium	0.3	1,500	62,913	62,799	1,739	2.8%	4,922	4,922	286	5.8%
vanadium	0.2	21	62,981	37,954	1,680	2.7%	4,922	3,625	163	3.3%
chromium-6	0.03	-	62,837	47,503	-	-	4,919	4,401	-	-
chlorate	20	210	62,859	34,426	9,796	15.6%	4,918	3,391	1,896	38.6%
1,4-dioxane	0.07	0.35 / 35[5]	36,810	4,197	1,081 / 0[6]	2.9% / 0%[6]	4,915	1,077	341/ 0[6]	6.9% / 0%[6]
1,1-dichloroethane	0.03	6.14 / 614[5]	36,848	835	1 / 0[6]	0.003% / 0%[6]	4,916	244	1 / 0[6]	0.02% / 0%[6]
1,2,3-trichloropropane	0.03	0.0004 / 0.04[5]	36,848	256	256 / 197[6]	0.7% / 0.5%[6]	4,916	67	67 / 55[6]	1.4% / 1.1%[6]
1,3-butadiene	0.1	0.0103 / 1.03[5]	36,848	2	2 / 0[6]	0.005% / 0%[6]	4,916	2	2 / 0[6]	0.04% / 0%[6]
Halon 1011	0.06	90	36,847	655	0	0%	4,916	309	0	0%
HCFC-22	0.08	-	36,847	827	-	-	4,916	286	-	-
bromomethane	0.2	140	36,848	115	0	0%	4,916	49	0	0%
chloromethane	0.2	2.69 / 269[5]	36,845	283	20 / 0[6]	0.05% / 0%[6]	4,916	138	8 / 0[6]	0.2% / 0%[6]
PFBS	0.09	-	36,972	19	-	-	4,920	8	-	-
PFHpA	0.01	-	36,972	236	-	-	4,920	86	-	-
PFHxS	0.03	-	36,971	207	-	-	4,920	55	-	-
PFNA	0.02	-	36,972	19	-	-	4,920	14	-	-
PFOS	0.04	0.07	36,972	292	124	0.3%	4,920	95	46	0.9%
PFOA	0.02	0.07	36,972	379	32	0.09%	4,920	117	13	0.3%
estriol	0.0008	0.35	11,796	4	0	0%	1,201	4	0	0%
4-androstene-3,17-dione	0.0003	-	11,796	101	-	-	1,201	77	-	-
equilin	0.004	0.35	11,796	0	0	0%	1,201	0	0	0%
17β-estradiol	0.0004	0.0009 / 0.09[5]	11,795	4	1 / 0[6]	0.008% / 0%[6]	1,201	2	1 / 0[6]	0.08% / 0%[6]
estrone	0.002	0.35	11,796	0	0	0%	1,201	0	0	0%
17α-ethynylestradiol	0.0009	0.035	11,796	4	0	0%	1,201	4	0	0%
testosterone	0.0001	-	11,795	72	-	-	1,201	65	-	-

[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] Ref Conc – Reference Concentration. See Terms and Definitions.
[4] UCMR 3 chemical 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 3 website. For the metals, samples were collected at the entry point to the distribution system (EP) and the distribution system at maximum residence time (MR), increasing their total AM results.
[5] The first number is the reference concentration for 10^{-6} cancer risk; the second number is the reference concentration for 10^{-4} cancer risk.
[6] The first number is associated with the first reference concentration; the second number is associated with the second reference concentration.

Table 3b. UCMR 3 Data Summary for Microbiological Contaminants

Contaminant[1]	UCMR MRL[2]	Units	Total number of results[3]	Number of results ≥MRL	Total number of PWSs with results[3]	Number of PWSs with results ≥MRL
enteroviruses (cell culture)	0.002	MPN[4]/L[5]	1,044	2	789	2
enteroviruses (RT-qPCR[6])	0.398	GC[7]/L	1,044	6	789	6
noroviruses GIA[8]	0.398	GC/L	1,044	4	789	4
noroviruses GIB[9]	0.398	GC/L	1,044	2	789	2
noroviruses GII[10]	0.398	GC/L	1,044	4	789	4
total coliforms	1	MPN/100mL	1,045	57	791	53
E. coli	1	MPN/100mL	1,045	3	791	3
Enterococci	1	MPN/100mL	1,044	41	792	41
aerobic spores	1	SFO[11]/100mL[12]	1,047	317	793	252
male specific phage	1	PFU[13]/100mL	1,029	14	783	14
somatic phage	1	PFU/100mL	1,029	5	783	5

[1] Gray rows represent results for microbial indicators.
[2] UCMR MRL – EPA-established UCMR Minimum Reporting Level. Based on laboratory capability of the analytical method; not related to contaminant health effects information. Under UCMR 3, microbe analytical results were reported as "below", "at", or "above" MRL. It is important to note that microbial contamination can be transient in nature and microbial results under UCMR 3 should be interpreted in the context of the time samples were collected. However, the presence of any UCMR 3 microbe indicates a potential vulnerability of the PWS to contamination.
[3] UCMR 3 microbiological contaminants were monitored under the Pre-Screen Testing (PST) design. For more information, refer to the EPA's UCMR 3 website.
[4] MPN – Most Probable Number
[5] L – liters
[6] RT-qPCR – Reverse Transcription-Polymerase Chain Reaction
[7] GC – Genomic Copies
[8] Noroviruses GIA – qPCR analysis of norovirus genogroup I with RT-qPCR primer set A
[9] Noroviruses GIB – qPCR analysis of norovirus genogroup I with RT-qPCR primer set B
[10] Noroviruses GII – qPCR analysis of norovirus genogroup II
[11] SFO – Spore Forming Units
[12] mL – milliliters
[13] PFU – Plaque Forming Units

Data Considerations

The UCMR 3 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 3 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 4). 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. **Note:** Results for the microbial indicators (gray rows in Table 3b) are not included in the UCMR Archival Data Finder (see **UCMR3_Virus_Indicators.txt** as described below).

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 3 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 5), select one of the following zip (.zip) files from UCMR 3 (2013-2015) Occurrence Data:
    - **UCMR 3 Occurrence Data Text Files** to view all the analytical results (*i.e.*, results for all contaminants reported by all PWSs). Since the **UCMR3_All.txt** file is too large to be imported into Excel, you can try other applications (*e.g.*, Microsoft Access) or import a subset of the data as described below.
    - **UCMR 3 Occurrence Data Text Files by State** to view all the analytical results, organized by Tribes and states. Within that zip file, one text file (**UCMR3_All_Tribes_AK_LA.txt**) will have all results for Tribal PWSs and for the states starting alphabetically with A through L; another file (**UCMR3_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 3 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 300.1 file with results for chlorate).
- The following text files for **additional data elements** and **indicators** (*i.e.*, information beyond analytical results for the 30 UCMR 3 contaminants) are also contained in each of the above zip files:
    - **UCMR3_ZIPCodes.txt** – U.S. Postal Service ZIP Code(s) for all areas served by a PWS (data definitions provided in Table 6)
    - **UCMR3_Virus_Indicators.txt** – Analytical results from PST monitoring for microbiological indicators including total coliforms, *E. coli, Enterococci*, aerobic spores, male specific phage, and somatic phage (data definitions provided in Table 5)
    - **UCMR3_Disinfectant_AddtlDataElem.txt** – Disinfectant Type (data definitions provided in Table 7)

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 3 website.

In addition to reporting occurrence data for UCMR 3 contaminants, the EPA tasked the laboratories it contracted to analyze small PWS samples with reporting results for **sec-butylbenzene**, **n-propylbenzene**, **tellurium**, **germanium**, and **manganese**. These additional unregulated contaminants were within the scope of the methods already performed for the UCMR 3 contaminants. The results from small PWS monitoring for the additional contaminants are included in the UCMR Archival Data Finder and the occurrence data text files.

Table 4. UCMR 3 Data Definitions for the UCMR Archival Data Finder

The data definitions below are specific to the UCMR 3 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 3 (2013–2015)**
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 3 contaminant analyzed
Result	Numeric value of the analytical result in µg/L for the chemical contaminants and GC/L or MPN/L for the viruses. Results less than the UCMR MRL are indicated by **<MRL**
Units	Units of the UCMR MRL and analytical results: **µg/L** (micrograms per liter), **GC/L** (genomic copies per liter), **MPN/L** (most probable number 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 3, based on retail population as indicated by the Safe Drinking Water Information System (Federal) (SDWIS/FED) as of December 31, 2010: **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, 10)
Associated Facility ID	Identification code for the facility of the associated MR
Associated Sample Point ID	Identification code for the sample point of the associated MR
Monitoring Requirement	**AM** (Assessment Monitoring), **SS** (Screening Survey), **PST** (Pre-Screen Testing)
Minimum Reporting Level (MRL)	Minimum Reporting Level defined by UCMR 3 in µg/L for the chemical contaminants and GC/L or MPN/L for the viruses. Based on laboratory capability; not related to contaminant health effects information (see Terms and Definitions)
UCMR1 Sample Type	Null for UCMR 3
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 5. Data Definitions for Text Files: UCMR3_All, UCMR3_All_Tribes_AK_LA, UCMR3_All_MA_WY, UCMR3_*MethodNumber*, and UCMR3_Virus_Indicators

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 3, based on retail population as indicated by the Safe Drinking Water Information System (Federal) (SDWIS/FED) as of December 31, 2010: **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	Identification code for the facility of the associated MR
AssociatedSamplePointID	Identification code for the sample point of the associated MR
CollectionDate	Date of sample collection (month, day, year)
SampleID	Identification code for each sample
Contaminant	The UCMR 3 contaminant analyzed
MRL	Minimum Reporting Level (MRL) defined by UCMR 3 in µg/L for the chemical contaminants and GC/L or MPN/L for the viruses; *for UCMR3_Virus_Indicators.txt only,* in SFO/100mL, PFU/100mL, or MPN/100mL for the indicators. Based on laboratory capability; not related to contaminant health effects information (see Terms and Definitions)
Units	Units of the UCMR MRL and analytical results: **µg/L** (micrograms per liter), **GC/L** (genomic copies per liter), **MPN/L** (most probable number per liter); *for UCMR3_Virus_Indicators.txt only,* **SFO/100mL** (spore forming units per one hundred milliliters), **PFU/100mL** (plaque forming units per one hundred milliliters), **MPN/100mL** (most probable number per one hundred milliliters)
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 chemical contaminants and GC/L or MPN/L for the viruses; *for UCMR3_Virus_Indicators.txt only,* in SFO/100mL, PFU/100mL, or MPN/100mL for the indicators. 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), **PST** (Pre-Screen Testing)
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, 10)
UCMR1SampleType	Null for UCMR 3

Table 6. Data Definitions for Text File: UCMR3_ZIPCodes

Field Name	Definition
ZIPCODE	U.S. Postal Service ZIP Code(s) for all areas served by a PWS. This is entered by the PWS

Table 7. Data Definitions for Text File: UCMR3_Disinfectant_AddtlDataElem

Additional Data Element	Definition and Response Options
DisinfectantType	All of the disinfectants/oxidants that have been added prior to the entry point to the distribution system. Please select ALL that apply. **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), **CLDO** = chlorine dioxide, **OZON** = ozone, **ULVL** = ultraviolet light, **OTHD** = other types of disinfectant, **NODU** = no disinfectant used