



Public Water System Code	Public Water System Name	Facility ID	Sample Point ID	Sample Point Name	Sample Point Type		Sampling Event	Analysis Date	Comment	Sample ID	Collection Date	Method Code	Analyte	Result Measure	Minimum Reporting Level	Analyte Status
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE2	202402		35861104001SE2	2/15/2024	EPA 533	PFOS	< MRL	0.004	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE2	202402		35861104001SE2	2/15/2024	EPA 533	PFPeA	0.0037	0.003	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE2	202402		35861104001SE2	2/15/2024	EPA 533	PFPeS	< MRL	0.004	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE2	202402		35861104001SE2	2/15/2024	EPA 533	PFUnA	< MRL	0.002	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE2	202402		35861104001SE2	2/15/2024	EPA 537.1	NetFOSAA	< MRL	0.005	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE2	202402		35861104001SE2	2/15/2024	EPA 537.1	NMeFOSAA	< MRL	0.006	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE2	202402		35861104001SE2	2/15/2024	EPA 537.1	PFTA	< MRL	0.008	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE2	202402		35861104001SE2	2/15/2024	EPA 537.1	PFTTrDA	< MRL	0.007	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE3	202405		35878165001SE3	5/7/2024	EPA 200.7	lithium	11.7	9	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE3	202405		35878165001SE3	5/7/2024	EPA 533	11Cl-PF3OUds	< MRL	0.005	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE3	202405		35878165001SE3	5/7/2024	EPA 533	4:2 FTS	< MRL	0.003	PWS Approved
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NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE3	202405		35878165001SE3	5/7/2024	EPA 533	8:2 FTS	< MRL	0.005	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE3	202405		35878165001SE3	5/7/2024	EPA 533	9Cl-PF3ONS	< MRL	0.002	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE3	202405		35878165001SE3	5/7/2024	EPA 533	ADONA	< MRL	0.003	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE3	202405		35878165001SE3	5/7/2024	EPA 533	HFPO-DA	< MRL	0.005	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE3	202405		35878165001SE3	5/7/2024	EPA 533	NFDHA	< MRL	0.02	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE3	202405		35878165001SE3	5/7/2024	EPA 533	PFBA	< MRL	0.005	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE3	202405		35878165001SE3	5/7/2024	EPA 533	PFBS	< MRL	0.003	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE3	202405		35878165001SE3	5/7/2024	EPA 533	PFDA	< MRL	0.003	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE3	202405		35878165001SE3	5/7/2024	EPA 533	PFDoA	< MRL	0.003	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE3	202405		35878165001SE3	5/7/2024	EPA 533	PFEESA	< MRL	0.003	PWS Approved
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NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE3	202405		35878165001SE3	5/7/2024	EPA 533	PFMPA	< MRL	0.004	PWS Approved
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NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE3	202405		35878165001SE3	5/7/2024	EPA 533	PFOA	0.0055	0.004	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE3	202405		35878165001SE3	5/7/2024	EPA 533	PFOS	< MRL	0.004	PWS Approved
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NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE3	202405		35878165001SE3	5/7/2024	EPA 537.1	NetFOSAA	< MRL	0.005	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE3	202405		35878165001SE3	5/7/2024	EPA 537.1	NMeFOSAA	< MRL	0.006	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE3	202405		35878165001SE3	5/7/2024	EPA 537.1	PFTA	< MRL	0.008	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE3	202405		35878165001SE3	5/7/2024	EPA 537.1	PFTTrDA	< MRL	0.007	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE4	202408		35898582001SE4	8/13/2024	EPA 200.7	lithium	< MRL	9	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE4	202408		35898582001SE4	8/13/2024	EPA 533	11Cl-PF3OUds	< MRL	0.005	PWS Approved
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NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE4	202408		35898582001SE4	8/13/2024	EPA 533	PFBA	< MRL	0.005	PWS Approved
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NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE4	202408		35898582001SE4	8/13/2024	EPA 533	PFHpS	< MRL	0.003	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE4	202408		35898582001SE4	8/13/2024	EPA 533	PFHxA	< MRL	0.003	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE4	202408		35898582001SE4	8/13/2024	EPA 533	PFHxS	< MRL	0.003	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE4	202408		35898582001SE4	8/13/2024	EPA 533	PFMBA	< MRL	0.003	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE4	202408		35898582001SE4	8/13/2024	EPA 533	PFMPA	< MRL	0.004	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE4	202408		35898582001SE4	8/13/2024	EPA 533	PFNA	< MRL	0.004	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE4	202408		35898582001SE4	8/13/2024	EPA 533	PFOA	0.0056	0.004	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE4	202408		35898582001SE4	8/13/2024	EPA 533	PFOS	< MRL	0.004	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE4	202408		35898582001SE4	8/13/2024	EPA 533	PFPeA	< MRL	0.003	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE4	202408		35898582001SE4	8/13/2024	EPA 533	PFPeS	< MRL	0.004	PWS Approved
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NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE4	202408		35898582001SE4	8/13/2024	EPA 537.1	NETFOSAA	< MRL	0.005	PWS Approved
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NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE4	202408		35898582001SE4	8/13/2024	EPA 537.1	PFTA	< MRL	0.008	PWS Approved
NJ1219001	SAYREVILLE W DEPT	92001	Bordentown WTP	TP001001	Entry Point to Dist. System	EP	SE4	202408		35898582001SE4	8/13/2024	EPA 537.1	PFTTrDA	< MRL	0.007	PWS Approved

# The Fifth Unregulated Contaminant Monitoring Rule (UCMR 5)

## Program Overview Fact Sheet

### What is the Unregulated Contaminant Monitoring Rule (UCMR)?

As part of its responsibilities under the Safe Drinking Water Act (SDWA), the U.S. Environmental Protection Agency (EPA) implements Section 1445(a)(2), Monitoring Program for Unregulated Contaminants. SDWA requires that once every five years, EPA issue a list of priority unregulated contaminants to be monitored by certain public water systems across States, Tribes, and Territories. These contaminants may be present in drinking water but are not yet subject to EPA drinking water standards. Under the Unregulated Contaminant Monitoring Rule (UCMR), EPA collects nationally representative drinking water occurrence data to support EPA's future regulatory determinations and, as appropriate, assist in the development of national primary drinking water regulations (NPDWRs). For each UCMR cycle, EPA establishes a new list of contaminants for monitoring, specifies which systems are required to monitor, identifies the sampling locations, and defines the analytical methods to be used. On December 17, 2021, EPA Administrator Michael Regan signed the final "Revisions to the Unregulated Contaminant Monitoring Rule (UCMR 5) for Public Water Systems" and the rule was subsequently published in the *Federal Register* on December 27, 2021 (86 FR 73131). The 5-year UCMR 5 cycle spans 2022 – 2026, with preparations in 2022, sample collection from 2023 – 2025, and completion of data reporting in 2026.

### Which water systems will participate in UCMR 5?

Section 2021 of America's Water Infrastructure Act of 2018 (AWIA) (Public Law 115-270) amended SDWA and specifies that, subject to the availability of EPA appropriations for such purpose and sufficient laboratory capacity, EPA must require all public water systems serving between 3,300 and 10,000 people to monitor and ensure that a nationally representative sample of systems serving fewer than 3,300 people monitor for the contaminants in UCMR 5 and future UCMR cycles. Systems serving a population of more than 10,000 people (large systems) continue to be responsible for participating in the UCMR program.

EPA anticipates approximately one-third of all systems will collect samples each year between 2023 and 2025. If EPA does not receive the appropriations needed in a given year, EPA will reduce the number of small systems that will be asked to perform monitoring.

Size Category (Number of People Served)	Monitoring Design (CWSs and NTNCWSs) <sup>2</sup>	Total # of Systems per Size Category
<b>Small Systems<sup>1</sup></b> (fewer than 3,300)	Nationally representative sample	800
<b>Small Systems<sup>1</sup></b> (3,300-10,000)	All systems, if confirmed by EPA	5,147 <sup>3</sup>
<b>Large Systems</b> (10,001 and over)	All systems	4,364 <sup>3</sup>
<b>Total</b>		10,311

1. This requirement is based on the availability of appropriations and sufficient laboratory capacity

2. Community Water Systems (CWSs), Non-Transient Non-Community Water Systems (NTNCWSs)

3. Counts are approximate

## What contaminants are in UCMR 5?

UCMR 5 specifies monitoring for 29 per- and polyfluoroalkyl substances (PFAS) and lithium listed in the table below.

Contaminant	CASRN <sup>1</sup>	MRL <sup>2</sup> (µg/L)	Additional Information
25 PFAS: EPA Method 533			
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	763051-92-9	0.005	PFAS are a group of synthetic chemicals used in a wide range of consumer products and industrial applications including: non-stick cookware, water-repellent clothing, stain-resistant fabrics and carpets, cosmetics, firefighting foams, electroplating, and products that resist grease, water, and oil. PFAS are found in the blood of people and animals and in water, air, fish, and soil at locations across the United States and the world.
1 <i>H</i> ,1 <i>H</i> , 2 <i>H</i> , 2 <i>H</i> -perfluorodecane sulfonic acid (8:2FTS)	39108-34-4	0.005	
1 <i>H</i> ,1 <i>H</i> , 2 <i>H</i> , 2 <i>H</i> -perfluorohexane sulfonic acid (4:2FTS)	757124-72-4	0.003	
1 <i>H</i> ,1 <i>H</i> , 2 <i>H</i> , 2 <i>H</i> -perfluorooctane sulfonic acid (6:2FTS)	27619-97-2	0.005	
4,8-dioxa-3 <i>H</i> -perfluorononanoic acid (ADONA)	919005-14-4	0.003	
9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	0.002	
hexafluoropropylene oxide dimer acid (HFPO-DA)(GenX)	13252-13-6	0.005	
nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	151772-58-6	0.02	
perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	113507-82-7	0.003	
perfluoro-3-methoxypropanoic acid (PFMPA)	377-73-1	0.004	
perfluoro-4-methoxybutanoic acid (PFMBA)	863090-89-5	0.003	
perfluorobutanesulfonic acid (PFBS)	375-73-5	0.003	
perfluorobutanoic acid (PFBA)	375-22-4	0.005	
perfluorodecanoic acid (PFDA)	335-76-2	0.003	
perfluorododecanoic acid (PFDoA)	307-55-1	0.003	
perfluoroheptanesulfonic acid (PFHpS)	375-92-8	0.003	
perfluoroheptanoic acid (PFHpA)	375-85-9	0.003	
perfluorohexanesulfonic acid (PFHxS)	355-46-4	0.003	
perfluorohexanoic acid (PFHxA)	307-24-4	0.003	
perfluorononanoic acid (PFNA)	375-95-1	0.004	
perfluorooctanesulfonic acid (PFOS)	1763-23-1	0.004	
perfluorooctanoic acid (PFOA)	335-67-1	0.004	
perfluoropentanesulfonic acid (PFPeS)	2706-91-4	0.004	
perfluoropentanoic acid (PFPeA)	2706-90-3	0.003	
perfluoroundecanoic acid (PFUnA)	2058-94-8	0.002	
4 PFAS: EPA Method 537.1			
<i>N</i> -ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	2991-50-6	0.005	See above for PFAS information.
<i>N</i> -methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	2355-31-9	0.006	
perfluorotetradecanoic acid (PFTA)	376-06-7	0.008	
perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.007	
Metal/Pharmaceutical: EPA Method 200.7; SM <sup>3</sup> 3120 B (2017); SM <sup>3</sup> 3120 B-99 (1999); ASTM <sup>4</sup> D1976-20			
lithium	7439-93-2	9	Naturally occurring metal that may concentrate in brine waters; lithium salts are used as pharmaceuticals, used in electrochemical cells, batteries, and in organic syntheses.

1. CASRN – Chemical Abstracts Service Registry Number

2. MRL – Minimum Reporting Level

3. SM – Standard Methods

4. ASTM – ASTM International

## Where will samples be collected?

UCMR 5 samples will be collected at entry points to the distribution system (EPTDS) for all contaminants.

- With prior approval, large ground water systems that have multiple EPTDSs can sample at representative sampling locations rather than at each EPTDS through a Ground Water Representative Monitoring Plan (GWRMP).
- Systems that purchase water with multiple connections from the same wholesaler may select one representative connection from that wholesaler. The representative EPTDS must be a location within the purchaser's water system. This EPTDS sampling location must be representative of the highest annual volume.

## What is the sampling frequency and timing?

Water systems will be required to collect samples based on the typical UCMR sampling frequency and timeframe.

Water Source	Timeframe	Sampling Frequency
Surface water, ground water under the direct influence of surface water, or mixed sources systems	Year-Round	Systems must monitor 4 times during a consecutive 12-month monitoring period. Sample events must occur 3 months apart.
Ground water systems	Year-Round	Systems must monitor 2 times during a consecutive 12-month monitoring period. Sample events must occur 5-7 months apart.

## What does UCMR 5 participation involve? Who pays?

All systems required to participate in UCMR 5 will *collect* samples. As with previous UCMRs, *large* systems make arrangements with approved laboratories and pay for their own sample shipping and analytical costs; EPA arranges for the analysis of *small*-system samples and pays for shipping and analytical costs. All laboratories conducting analyses for UCMR 5 must receive EPA approval to perform those analyses ([UCMR Laboratory Approval Program](#)).

## How did EPA select the UCMR 5 contaminants?

The National Defense Authorization Act for Fiscal Year 2020 (NDAA) specifies that EPA shall include all PFAS in UCMR 5, for which a drinking water method has been validated by the Administrator and that are not subject to an NPDWR. Accordingly, UCMR 5 includes all 29 PFAS that are within the scope of EPA Methods 533 and 537.1, as well as lithium. In evaluating contaminants for UCMR 5, EPA considered the fourth Contaminant Candidate List (CCL 4) as well as contaminants nominated by the public for potential inclusion on the fifth CCL (CCL 5) and other priority contaminants.

EPA selected UCMR contaminants using a multi-step prioritization process. The first step identified contaminants that were not monitored under previous UCMR cycles; may have significant occurrence nationally; and have a completed, validated drinking water method. The next step focused on contaminants associated with one or more of the following considerations: an available health assessment to facilitate regulatory determinations; high public concern; critical health endpoints (for example, a likely or suggestive carcinogen); active use (for example, pesticides); and/or an occurrence data gap. Then EPA considered stakeholder input; looked at cost-effectiveness of analytical methods (single methods that address multiple contaminants of interest); considered implementation factors (such as laboratory capacity); and further considered available health data (e.g., children), occurrence data, and persistence/mobility data.

## What are the public health benefits of the UCMR program?

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The UCMR program provides EPA and other interested parties with nationally representative occurrence data on emerging contaminants in drinking water. The data can be used to support EPA's regulatory determinations and may support additional actions to protect public health.

The public benefits from the information about whether or not unregulated contaminants are present in their drinking water. If contaminants are not found, consumer confidence in their drinking water should improve. If contaminants are found, related health effects may be avoided when subsequent actions, such as regulations, are implemented, reducing or eliminating those contaminants.

## Where can consumers find UCMR results?

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All systems are required to report their data to EPA. The analytical results from UCMR are stored in the [National Contaminant Occurrence Database \(NCOD\)](#) for drinking water. For a summary of the UCMR results, tips for querying NCOD, and health effects information (including reference concentrations), please refer to the [UCMR Occurrence Data webpage](#).

The [Public Notification Rule](#) requires that all systems notify their customers of the availability of UCMR results no later than 12-months after results are known. Community Water Systems (CWSs) are also required to report UCMR results in their annual [Consumer Confidence Report](#) (CCR) when unregulated contaminants are detected (the CCR Rule does not apply to non-community water systems). CWSs may include their public notice within CCRs, also known as annual drinking water quality reports, which are to be delivered to all billing customers by July 1 of each year. CWSs must report the average of the year's monitoring results and the range of detections. To obtain a copy of their CCR, consumers may check their water bill for information or contact their water supplier. Additional information about the CCR including details on reporting requirements can be found on the [CCR Homepage](#).

## What are the key deadlines and requirements?

Due Date	Requirement	Report via SDWARS <sup>1</sup>
Following Rule Publication on December 27, 2021		
August 1, 2022	<b>Laboratories</b> seeking approval must complete and submit the necessary registration form and application materials in order to participate in the laboratory approval process. Contact <a href="mailto:UCMR_Lab_Approval@epa.gov">UCMR_Lab_Approval@epa.gov</a> for more information.	
December 31, 2022	<b>Large systems</b> must register for EPA's web-based reporting system "SDWARS", accept their notification letter, and update sampling location(s) and zip code(s). If applicable, the system may update their monitoring schedule. After December 31, 2022, large systems must contact <a href="mailto:UCMR_Sampling_Coordinator@epa.gov">UCMR_Sampling_Coordinator@epa.gov</a> to request any changes.	X
December 31, 2022	<b>Small systems</b> must register for SDWARS, accept their notification letter and update sampling location(s), shipping address, and zip code(s). Systems must provide an explanation and obtain approval for any requested monitoring schedule change. Contact the UCMR Message Center at <a href="mailto:UCMR5@glec.com">UCMR5@glec.com</a> for more information.	X
6 months prior to the water system's scheduled sample collection	<b>Large ground water systems</b> (or large surface water systems with ground water sources) that wish to monitor from representative EPTDSs may submit a ground water representative monitoring plan (GWRMP) approved under a prior UCMR cycle or a proposal for a new representative sampling plan. Systems scheduled for sample collection in 2023 are encouraged to submit plans by December 31, 2022, to allow time for review by EPA and, as appropriate, the State. Contact <a href="mailto:UCMR_Sampling_Coordinator@epa.gov">UCMR_Sampling_Coordinator@epa.gov</a> for more information.	
Following Sample Collection		
Within 90 days of sample collection	<b>Laboratories</b> post data to SDWARS.	X
Within 30 days of laboratory posting data	<b>Large water systems</b> review and approve the data. If the system has not acted upon the data after 30 days, the data are considered approved and ready for state and EPA review.	X

1. [Safe Drinking Water Accession and Review System \(SDWARS\)](#).



## What are the data elements EPA will collect?

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EPA will collect the following information in EPA's web-based data reporting system, SDWARS.

Public Water System Identification (PWSID) Code	Disinfectant Type	Analysis Date
Public Water System Name	Treatment Information	Sample Analysis Type
Public Water System Facility Identification Code	Sample Collection Date	Analytical Result–Sign
Public Water System Facility Name	Sample Identification Code	Analytical Result–Measured Value
Public Water System Facility Type	Contaminant	Additional Value
Water Source Type	Analytical Method Code	Laboratory Identification Code
Sampling Point Identification Code	Extraction Batch Identification Code	Sample Event Code
Sampling Point Name	Extraction Date	Historical Information for Contaminant Detections and Treatment
Sampling Point Type Code	Analysis Batch Identification Code	Potential PFAS Sources

## Where can I find more information?

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- [Safe Drinking Water Information Website](#) for information on how to submit drinking water comments or questions to EPA Office of Ground Water and Drinking Water
- [UCMR Website](#) for information on current and past UCMRs, occurrence data, and public meetings
- [EPA Ground Water and Drinking Water Website](#) for information on source water protection, drinking water regulations, monitoring requirements for States and systems, SDWA on Tribal lands, and laboratory certification
- [EPA PFAS Website](#) for information on the Agency's actions to address PFAS

## Questions?

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- Contact the UCMR Message Center at [UCMR5@glec.com](mailto:UCMR5@glec.com) for general information about monitoring requirements or navigating SDWARS
- Contact [UCMR\\_Sampling\\_Coordinator@epa.gov](mailto:UCMR_Sampling_Coordinator@epa.gov) for changes to large water system inventory and/or schedule after December 31, 2022
- Contact [UCMR\\_Lab\\_Approval@epa.gov](mailto:UCMR_Lab_Approval@epa.gov) for information on the laboratory approval program and general laboratory support

## Lithium in Drinking Water

### A Resource for Primacy Agencies

Under the Fifth Unregulated Contaminant Monitoring Rule ([UCMR 5](#)), the U.S. Environmental Protection Agency (EPA) is gathering information on the occurrence of lithium in public drinking water. The EPA collects nationally representative drinking water occurrence data to support the agency's future regulatory determinations and, as appropriate, the development of national primary drinking water regulations (NPDWRs) under the Safe Drinking Water Act (SDWA). This monitoring also helps federal, state, and other researchers prioritize studies for health effects information, identify data gaps, and determine the need for future studies to improve our understanding of the possible health risks associated with unregulated contaminants in public drinking water.

The EPA has developed this document to help Primacy Agencies interpret the UCMR 5 monitoring results, understand health risks based on available information, and respond to public inquiries.

### Background on Lithium

#### Lithium Sources and Environmental Occurrence

- Lithium is a naturally occurring element and may be found at higher concentrations in certain parts of the country, particularly in groundwater sources in arid locations in the Western U.S. where geologic formations contain lithium salts (EPA, 2008; Lindsey et al., 2021).
- Lithium, in various formulations, has numerous commercial uses including as a pharmaceutical drug, an industrial chemical catalyst, a sanitizing agent for swimming pools and hot tubs, and increasingly, as a component of lithium-ion batteries for electronics and electric vehicles (EPA, 2008; Agusdinata et al., 2018).
- Lithium is likely present in a variety of foods (such as cereal grains, leafy vegetables, and root crops), but it is not clear which foods may be significant sources of dietary lithium (EPA, 2008). There are differing perspectives on whether lithium is beneficial in small amounts (*e.g.*, a micronutrient) (Szkarska and Rzymiski, 2019). The U.S. has no current recommended dietary allowance.

#### Lithium Pharmaceutical Use

- *Lithium salts* (*e.g.*, lithium carbonate [Li<sub>2</sub>CO<sub>3</sub>], lithium citrate [Li<sub>3</sub>C<sub>6</sub>H<sub>5</sub>O<sub>7</sub>]) have been used clinically for decades in the U.S. as a mood-stabilizing medication, primarily for bipolar disorder (NAMI, 2021).
- Therapeutic doses of lithium compounds generally range from 600-1,200 mg/day (NAMI, 2021).
- Therapeutic doses carry the risk of harmful side effects, so therapy strategies are based on a risk-benefit assessment for individual patients (EPA, 2008).

## UCMR 5

SDWA requires that every five years the EPA publish monitoring requirements for priority contaminants that may be present in drinking water and do not have EPA drinking water regulatory standards. UCMR 5, which includes lithium, spans 2022 – 2026, with sample collection by public water systems (PWSs) from 2023 – 2025 and the completion of data reporting in 2026 (EPA, 2021a; EPA, 2021b). [Learn more about UCMR 5](#).

Lithium is on the EPA's Fifth Contaminant Candidate List ([CCL 5](#)), a priority list of drinking water contaminants that are known or anticipated to occur in PWSs and may require future regulation under SDWA (EPA, 2022a). The UCMR program typically uses the CCL to identify contaminants without sufficient occurrence data to inform regulatory decision making. Lithium was selected for UCMR 5 through a contaminant prioritization process that considered expected or known occurrence in drinking water and the availability of health effects information (EPA, 2021c).

## Screening Levels and Reporting Limits for Drinking Water

- The EPA has not established a non-regulatory drinking water Health Advisory or any regulatory standard for lithium in public drinking water supplies. The EPA calculated a provisional oral reference dose (p-RfD) of 2 µg/kg-day using the Provisional Peer-Reviewed Toxicity Value ([PPRTV](#)) process. A PPRTV is defined as a toxicity value derived for use in the Superfund Program when such a value is not available from the EPA's Integrated Risk Information System (IRIS). This PPRTV process involves a more limited assessment compared to those conducted under the agency's IRIS process. The provisional value for lithium is based on adverse effects observed in patients administered lithium therapeutically (generally 600-1,200 mg/day of lithium compound) (EPA, 2008; NAMI, 2021).
  - The EPA's Fifth Candidate Contaminant List (CCL 5) Health Reference Level (HRL) of 10 µg/L is based on the p-RfD, consideration of the general population risk, a daily drinking water ingestion rate of 33.8 ml/kg-day, and a "default" assumption that drinking water accounts for 20% of daily lithium intake compared with other sources (EPA, 2022b). The U.S. Geological Survey (USGS) also published a 10 µg/L screening level for lithium (USGS, 2018).
  - As an alternative non-regulatory screening level, the USGS published a "drinking water only" benchmark (*i.e.*, based on an assumption that drinking water is the only source of daily lithium intake) of 60 µg/L to provide context for evaluating lithium concentrations in groundwater (Lindsey et al., 2021).
- The U.S. Food and Drug Administration (FDA) has not established a standard for lithium in bottled water at this time. The FDA bottled water resources are available on the [Bottled Water Everywhere: Keeping it Safe](#) webpage.
- The UCMR 5 program established a minimum reporting level (MRL) of 9 µg/L for lithium based on laboratory analytical measurement capability using EPA Method 200.7 (EPA, 1994; EPA, 2021a). UCMR MRLs are not associated with contaminant health effects information. Analysis using EPA Method 200.7 provides a concentration of total lithium, accounting for lithium from all compounds present in the water.

## Adverse Effects Observed in Humans at Therapeutic Doses

Adverse human health effects based on exposure at therapeutic doses have been observed in several organs and body systems of treated patients. The types of health effects are consistent with the limited number of available toxicology studies (EPA, 2008).

- Renal (kidney-related) effects: Lithium pharmaceutical treatment can interfere with the kidney's ability to concentrate urine, resulting in excessively dilute urine and feelings of thirst. Severe kidney disease may result from long-term treatment at higher doses (EPA, 2008).
- Neurologic (nervous system) and other effects: Lithium pharmaceutical treatment can cause lethargy, fatigue, weakness, tremor, and cognitive impairment, as well as impairment of endocrine gland function such as the thyroid and parathyroid. Other severe but rarer effects, including developmental effects, have also been associated with lithium therapy (EPA, 2008; Tondo et al., 2019).

## Uncertainties Associated with Risk Estimates for Drinking Water

There are uncertainties associated with risk estimates based on the findings in the PPRTV assessment (EPA, 2008).

- Despite the abundance of information on patients receiving lithium at *therapeutic* levels, there has historically been limited information available to evaluate health risks in people at the levels associated with typical drinking water consumption.
- The EPA derived the p-RfD of 2 µg/kg-day for lithium from a lowest-observed-adverse-effect level (LOAEL) because a no-observed-adverse-effect level (NOAEL) was not established for lithium. Therefore, there is uncertainty about the therapeutic lithium dose at or below which there are no adverse effects in humans or experimental systems. Additional data gaps include the lack of information about adverse human health effects resulting from long-term exposure to lithium and the populations or life stages with increased susceptibility to lithium exposure.
- To account for these uncertainties, the EPA applied a composite uncertainty factor of 1,000 to the lowest therapeutic dose associated with adverse effects in human patients to develop the p-RfD.

Example risk statements based on health screening levels and uncertainties:

- Health risk information is limited for lithium exposures from drinking water only ( $\leq 60$  µg/L) and from drinking water when considering all exposure sources ( $\leq 10$  µg/L). However, the EPA has applied a standard health-protective multiplier to account for this uncertainty; therefore, estimated exposures to these concentrations are unlikely to result in increased potential for human health concern based on the available health risk information.
- At present, the EPA cannot confidently estimate the risk for people with lithium exposures from drinking water between 10 µg/L and the much higher concentration equivalent to a therapeutic dose from lithium compounds.

## Drinking Water Treatment

Lithium cannot be removed by heating, boiling, or disinfecting water. Certain drinking water treatment approaches can reduce exposure. Available literature, based largely on bench- and pilot-scale data, suggests ion exchange is effective for removal of lithium from drinking water. Adsorption using certain novel media may also be effective. The EPA continues to review treatment literature and publish details regarding the removal efficiencies for various technology types for lithium via its [Drinking Water Treatability Database](#) (EPA, 2023).

## Summary Information

- Lithium is a naturally occurring metal, has numerous commercial uses including as a main component of batteries, and is likely found in a variety of foods. Lithium is also used as a pharmaceutical to treat certain medical conditions.
- Lithium is on the EPA's Fifth Contaminant Candidate List ([CCL 5](#)), a priority list of drinking water contaminants that may require future regulation under the Safe Drinking Water Act. Lithium was selected for the Fifth Unregulated Contaminant Monitoring Rule ([UCMR 5](#)) to better inform research and determine whether lithium poses health risks to people through drinking water from PWSs.
- The EPA continues to assess the literature for health effects information, identify data gaps, and determine the need for future studies to improve our understanding of the possible health risks associated with lithium in public drinking water.
- Research on the use of lithium as a pharmaceutical indicates that exposure at certain levels may be connected to adverse effects on the body's kidneys and nervous system. While the health effects in patients receiving lithium at therapeutic levels have been documented, there is limited information available to evaluate health risks for people exposed to lower levels of lithium via drinking water.<sup>1</sup>
  - The EPA does not currently have an EPA Health Advisory for lithium in drinking water. The screening Health Reference Level (HRL) of 10 µg/L from [CCL 5](#) is based on adverse effects observed in patients administered lithium therapeutically, not at levels expected to be found in drinking water. The occurrence data gathered by [UCMR 5](#) will help inform future steps the agency may take to protect public health.
- Lithium cannot be removed by heating, boiling, or disinfecting water. Certain drinking water treatment approaches can reduce exposure. The U.S. Food and Drug Administration (FDA) has not established a standard for lithium in bottled water.

## Additional Information about UCMR 5

PWSs inform their customers about their UCMR 5 monitoring results via the established Tier 3 Public Notification (PN) [[40 CFR 141.207](#)] and Consumer Confidence Report (CCR) [[40 CFR 141.153\(d\)\(7\)](#)] requirements. PWSs are required to notify their customers about the availability of all UCMR results no later than 12 months after they are known by the PWS. Community water systems (CWSs) are required to report UCMR results in their annual CCR when unregulated contaminants are found (*i.e.*, measured at or above UCMR minimum reporting levels). CWSs must report the average and range of the year's monitoring results. EPA resources for PWSs are available on the [CCR](#) and [PN](#) Compliance Help webpages.

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<sup>1</sup> Based on the concentration range (third quartile – maximum) of lithium observed in 1,464 public-supply wells (21 – 396 µg/L) (Lindsey et al., 2021), the average daily consumption of 2.5 L/day amounts to a maximum daily ingestion of 0.05 – 1.0 mg (as compared to the lower end of the therapeutic dose range for lithium compounds, 600 mg) (NAMI, 2021).

## Glossary of EPA Technical Terms

**Health Advisory (HA):** HA levels are non-regulatory concentrations of a contaminant in drinking water at which adverse health effects and/or aesthetic effects are not anticipated to occur over specific exposure durations (e.g., 1-day, 10 days, a lifetime). EPA's [HA documents](#) provide technical information on chemical and microbial contaminants that can cause human health effects and are known or anticipated to occur in drinking water. *[non-regulatory]*

**Health Reference Level (HRL):** Derived during the CCL 5 process for screening purposes. HRLs are used in EPA's Regulatory Determination process as risk-derived concentrations against which to evaluate the 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. *[non-regulatory]*

**Lowest-Observed-Adverse-Effect Level (LOAEL):** The lowest exposure level of a contaminant at which there are biologically significant increases in frequency or severity of adverse effects between the exposed population and its appropriate control group. *[non-regulatory]*

**Minimum Reporting Level (MRL):** Determined using data from multiple laboratories that participate in EPA's UCMR MRL-setting studies and are not associated with contaminant health effect information. The UCMR MRL is the lowest level of a contaminant that is considered measurable, with 95% confidence, by at least 75% of laboratories nationwide using a specified analytical method (recognizing that individual laboratories may be able to measure or quantify analytes at lower levels). EPA's UCMR 5 MRL for lithium is 9 µg/L. *[regulatory]*

**No-Observed-Adverse-Effect Level (NOAEL):** The highest exposure level of a contaminant at which there are no biologically significant increases in the frequency or severity of adverse effect between the exposed population and its appropriate control; some effects may be produced at this level, but they are not considered adverse or precursors of adverse effects. *[non-regulatory]*

**Oral Reference Dose (RfD):** An estimate, with uncertainty spanning perhaps an order of magnitude, of a daily oral exposure of a contaminant to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. *[non-regulatory]*

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