



Revisions to the Unregulated Contaminant Monitoring Rule for the Fifth Monitoring Cycle (UCMR 5): Public Meeting and Webinar

Held April 6 and 7, 2021 USEPA, Office of Ground Water and
Drinking Water



Revisions to the Unregulated Contaminant Monitoring Rule for the Fifth Monitoring Cycle (UCMR 5)



Public Meeting by Webinar



April 6 and 7, 2021

U.S. EPA

Office of Ground Water and Drinking Water



Welcome

Greg Carroll, U.S. EPA
Office of Ground Water and Drinking Water
Standards and Risk Management Division
Technical Support Center



Agenda	
Day 1/Day 2 (Eastern Time)	Topics
8:45-9:00am / 12:45-1:00pm	Log into the Meeting
9:00-9:10am / 1:00-1:10pm	Welcome, Logistics, Agenda
9:10-9:25am / 1:10-1:25pm	Overview of the UCMR Program
9:25-9:45am / 1:25-1:45pm	The Proposed UCMR 5
9:45-10:15am / 1:45-2:15pm	UCMR 5 Proposed Contaminants and Methods
10:15-10:20am / 2:15-2:20pm	Representative Sampling
10:20-10:30am / 2:20-2:30pm	UCMR 5 Reporting
10:30-10:45am / 2:30-2:45pm	Break
10:45-11:15am / 2:45-3:15pm	Laboratory Approval Process & MRLs
11:15-12:15pm / 3:15-4:15pm	Stakeholder Statements & Discussion
12:15-12:30pm / 4:15-4:30pm	Submitting Public Comments & Closing Remarks



Webinar Tips

- Webinar Slides
 - Located under “Handouts” in the right navigation bar on your screen
 - Slides contain all content that will be discussed
- Webinar Audio
 - Listen only mode until the discussion at the end
- Webinar Support
 - Send email to UCMRWebinar@cadmusgroup.com
 - e.g., “I can hear you speaking, but I cannot see the slides.”



Questions on the Presentation

- Click on “+” next to “Questions” in the control panel (Figure 1) to submit questions/comments
 - Type a question in the box; click send (Figure 2)
- Submit general clarifying questions throughout the webinar
 - Questions will be answered in the chat box throughout the presentation
 - Common questions will be answered at the end of each section

Figure 1

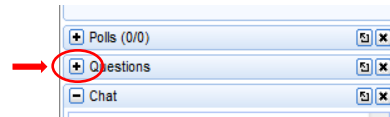
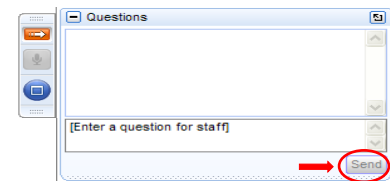


Figure 2



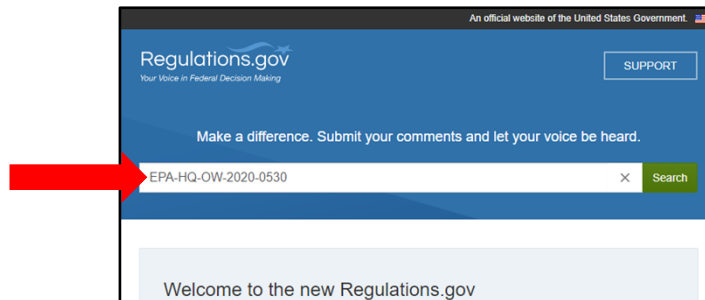
Specific PWS & Laboratory Questions about UCMR 5

- Public Water System (PWS)-Specific Questions
 - [UCMR Sampling Coordinator@epa.gov](mailto:UCMR_Sampling_Coordinator@epa.gov)
 - “My water system has five entry points, but we share three of those points with another water system. Where do I sample?”
- Laboratory-Specific Questions
 - [UCMR Lab Approval@epa.gov](mailto:UCMR_Lab_Approval@epa.gov)
 - “My laboratory merged with another laboratory since the last UCMR cycle, can we change our laboratory ID?”



Comments on the UCMR 5 Proposed Rule

- Go to <http://www.regulations.gov>
- Enter Docket ID EPA-HQ-OW-2020-0530
- Click **Search** button



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Comment Process/Accessing Docket


- The UCMR 5 docket should pop up on the next screen
- Click on the **Comment** button below the Proposed Rule



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Comment Process/Accessing Docket

- Enter comment and all required information on next screen
- Upload a document by clicking on the **Browse...** button
- Click on the **Submit Comment** button at the bottom of the page

Write a Comment
Read Agency Guidelines | Commenter's Checklist

Comment*

Start typing comment here...

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Attach Files

You can attach up to 20 files, but each file cannot exceed 10MB. Valid file types include: bmp, docx, gif, jpeg, pdf, png, pptx, rtf, shtml, tif, tiff, txt, wpd, xlsx, xml.

Drop files here or **Browse...**

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Comment Process/Accessing Docket

- Once submitted, comments cannot be edited or removed
- Do not electronically submit any information you consider to be Confidential Business Information (CBI)
- Multimedia submissions (audio, video, etc.) must be accompanied by a written comment
 - Written comment is considered the official comment and should include discussion of all points you wish to make
- EPA public comment policy is at:
<http://www.epa.gov/dockets/commenting-epa-dockets>
- **Comments/questions/statements raised during this meeting are not registered as official public comments**

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General Meeting Information

- Purpose
 - Announce the UCMR 5 proposal for public comment
 - Provide an opportunity for stakeholders to learn and discuss aspects of the UCMR 5 proposal:
 - Monitoring requirements
 - Analyte selection and rationale
 - Analytical methods
 - Representative monitoring
 - Reporting requirements
 - Laboratory approval process
- Webinar lines are muted to minimize background noise
- Discussion at the end of the webinar

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Overview of the Unregulated Contaminant Monitoring Rule Program

Brenda Bowden, U.S. EPA
Office of Ground Water and Drinking Water
Standards and Risk Management Division
Technical Support Center



Overview

- Regulatory background for UCMR, relationship to other Safe Drinking Water Act (SDWA) programs
 - Contaminant Candidate List (CCL)
 - The Unregulated Contaminant Monitoring Rule (UCMR)
 - UCMR objective
 - History of UCMR
 - Regulatory Determinations
 - National Primary Drinking Water Regulations (NPDWRs)
 - Six-Year Review

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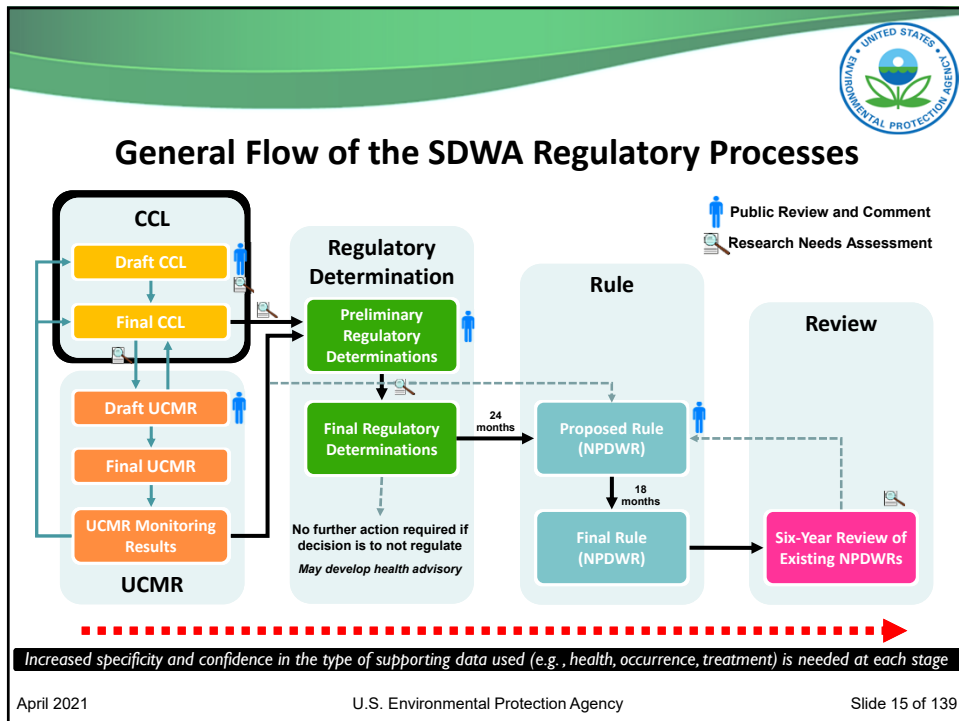
The Safe Drinking Water Act (SDWA)

- Enacted in 1974, the SDWA authorized the Environmental Protection Agency (EPA) to set enforceable health standards for contaminants in drinking water
 - National Primary Drinking Water Regulations (NPDWRs)
- The 1986 SDWA amendments were the basis for the original "UCM" program
 - State drinking water programs managed the original UCM program
 - Public Water Systems (PWSs) serving > 500 people were required to monitor
- The 1996 SDWA amendments changed the process of developing and reviewing NPDWRs
 - CCL
 - UCMR (EPA-managed)
 - Regulatory Determination
 - Six-Year Review

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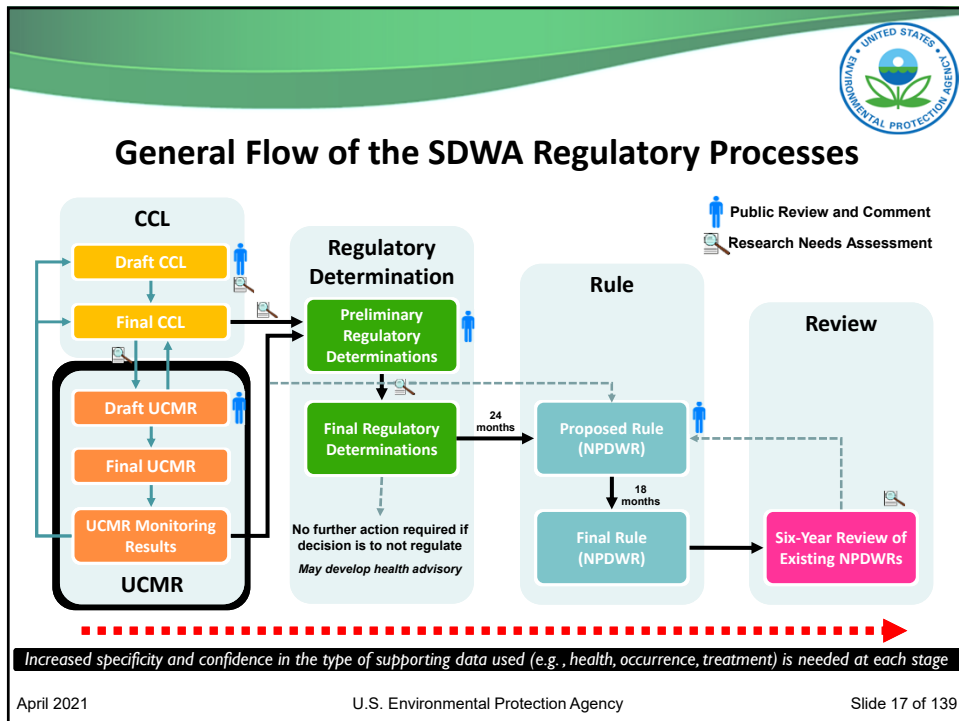


The Contaminant Candidate List (CCL)

- The SDWA 1412(b)(1)(B) required EPA to establish a listing of contaminants that are:
 - Not subject to any proposed or promulgated NPDWR
 - Known or anticipated to occur in PWSs
 - May require regulation under the SDWA
- List must be published every 5 years

The Final CCL 4 was published November 17, 2016 and includes 97 chemicals or chemical groups and 12 microbes

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The Unregulated Contaminant Monitoring Rule (UCMR)

- The SDWA section 1445(a)(2), as amended in 1996, established requirements for the UCMR Program:
 - Issue a list of no more than 30 priority unregulated contaminants in drinking water, once every 5 years
 - Require PWSs serving a population >10,000 people as well as a nationally representative sample of small PWSs serving ≤10,000 people to monitor
 - Make analytical results publicly available in the National Contaminant Occurrence Database for Drinking Water (NCOD)
 - The EPA funds shipping/analytical costs for small PWSs
- The EPA manages program in partnership with States, tribes, and territories (hereafter referred to as “States”) that volunteer to assist

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Objective of the UCMR Program

- Collect nationally representative occurrence data for unregulated contaminants that may require regulation under the SDWA
 - Consider data collected as part of future EPA decisions on actions to protect public health
 - Provide data to States, local governments, and to the public for their use in decisions regarding public health protection

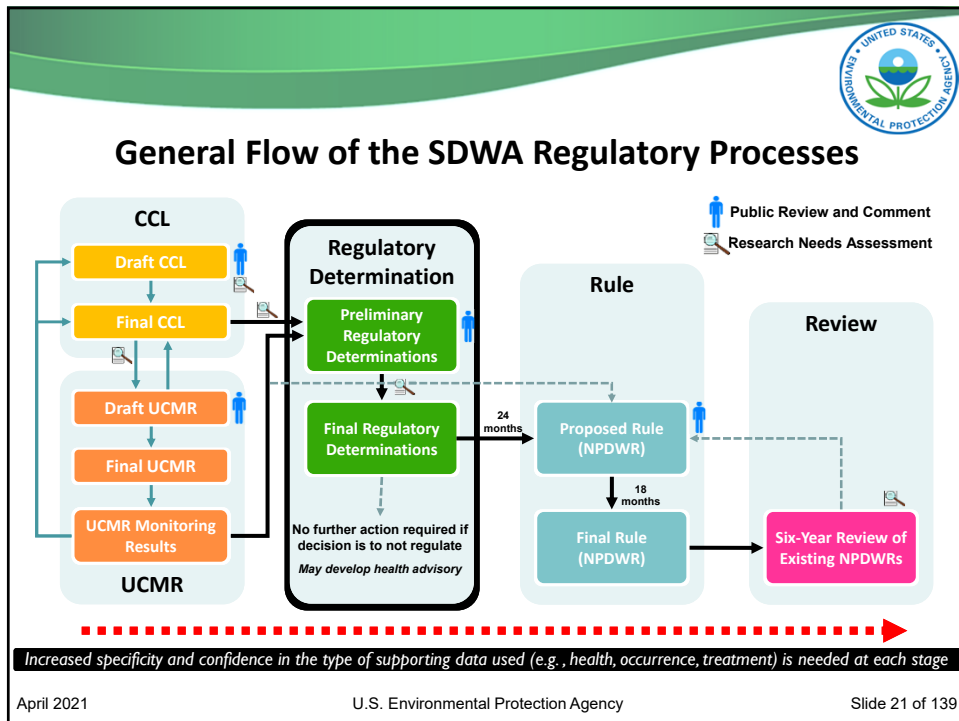
National occurrence data publicly available:
<http://www.epa.gov/dwucmr/occurrence-data-unregulated-contaminant-monitoring-rule>



History of the UCMR

- UCMR 1 (2001-2005)
 - Published in Federal Register (FR) on September 17, 1999
- UCMR 2 (2007-2011)
 - Published in FR on January 4, 2007
- UCMR 3 (2012-2016)
 - Published in FR on April 16, 2012
- UCMR 4 (2017-2021)
 - Published in FR on December 20, 2016
 - PWSs collected samples 2018-2020
- UCMR 5 (2022-2026)
 - Proposed rule published on March 11, 2021 (86 FR 13846)
 - Anticipates PWSs collecting samples 2023-2025

Each new UCMR cycle is established via a revision to the rule for the ongoing/preceding cycle

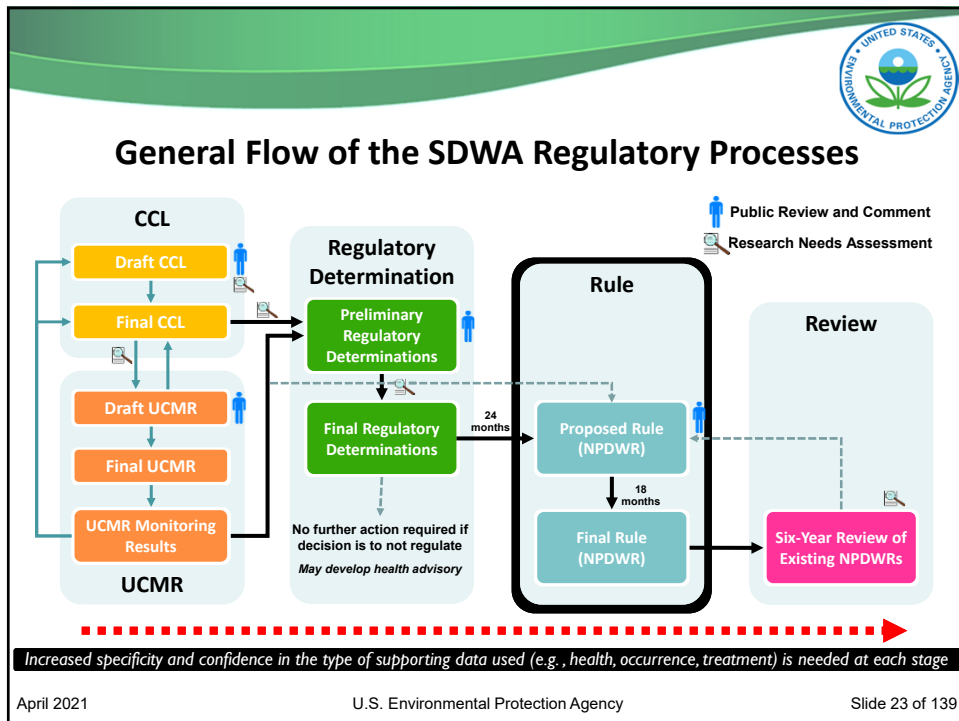


Regulatory Determinations

- Every five years, the Administrator shall, after notice of the preliminary determination and opportunity for public comment, for not fewer than five contaminants included on the CCL, make determinations on whether to regulate such contaminants
- The SDWA requires the EPA to publish a maximum contaminant level goal (MCLG) and promulgate a NPDWR for a contaminant if the Administrator determines that:
 1. The contaminant may have an **adverse effect** on the health of persons;
 2. The is **known to occur or there is substantial likelihood** that the contaminant will occur in PWSs with a frequency and at levels of public health concern; **and**
 3. In the sole judgment of the Administrator, regulation of such contaminant presents a meaningful opportunity for health risk reduction for persons served by PWSs

**SDWA Section 1412(b)(1)*

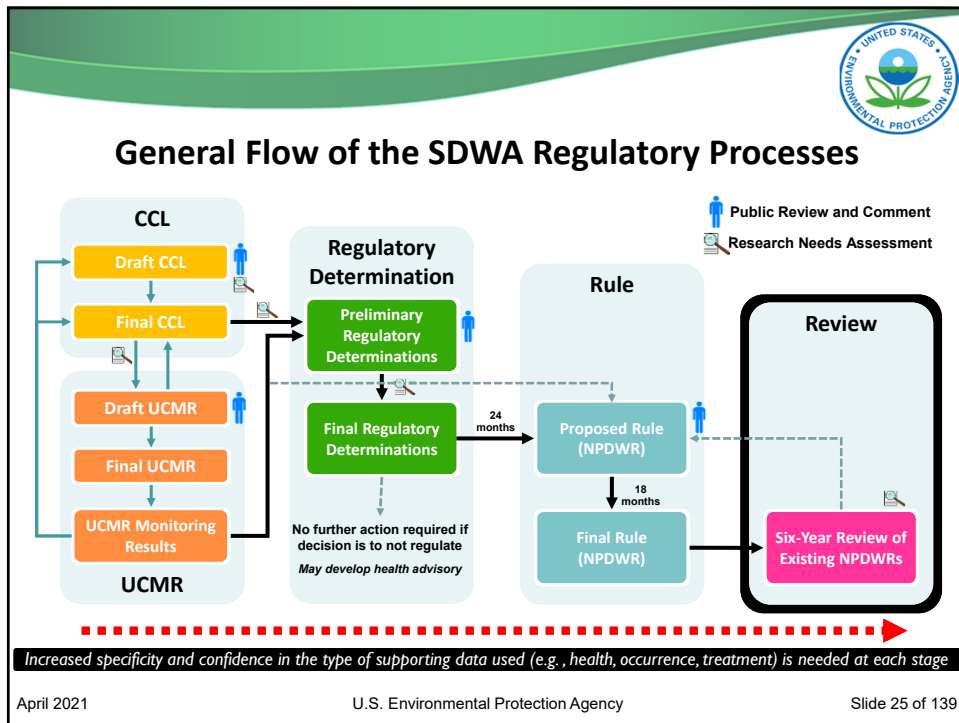
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National Primary Drinking Water Regulations (NPDWR)

- For each contaminant that the Administrator determines to regulate, the Administrator shall publish MCLGs and promulgate, by rule, NPDWRs. The Administrator shall:
 - Propose the MCLG and NPDWRs for a contaminant not later than 24 months after the determination to regulate
 - Publish a MCLG and promulgate a NPDWR within 18 months after the proposal thereof
- A NPDWR shall take effect three years after the date on which the regulation is promulgated. The Administrator, or a State, may allow this period to be extended up to two additional years if it determines that additional time is necessary for capital improvements

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Six-Year Review

- The SDWA Section 1412(b)(9) requires review and revision, as appropriate, of each NPDWR not less often than every six years. The review includes:
 - Re-evaluation of health effects, occurrence, exposure, analytical methods, treatment feasibility, risk-balancing and implementation issues
- Any revision of a NPDWR shall maintain, or provide for greater, protection of the health of persons

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The Proposed UCMR 5

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Standards and Risk Management Division
Technical Support Center



Overview

- America's Water Infrastructure Act (AWIA)
- National Defense Authorization Act (NDAA)
- Sampling and statistical design
- PWS types
- UCMR monitoring tiers
- Applicability
- Sampling schedules
- Sampling frequency and locations
- Timeline of activities
- Implementation roles
- Cost estimates



America's Water Infrastructure Act (AWIA) of 2018

- The SDWA was amended in 2018 by Public Law 115-270
 - AWIA section 2021
 - Enacted October 23, 2018
- Key changes to the UCMR (SDWA section 1445(j)):
 - Require PWSs serving between 3,300 and 10,000 to monitor
 - Ensure that only a representative sample of PWSs serving fewer than 3,300 people monitor
- Limitations:
 - Subject to the availability of appropriations and sufficient laboratory capacity to accommodate the analyses
- Authorization of Appropriations:
 - Additional \$15,000,000 in each fiscal year for which sampling is required to be carried out
- Under the AWIA provisions, EPA continues to be responsible for all analytical costs associated with monitoring at systems serving 10,000 or fewer people

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National Defense Authorization Act (NDAA) for Fiscal Year 2020

- Section 7311 of the NDAA (Public Law 116-92) requires EPA to include each Per- and Polyfluoroalkyl Substance (PFAS) in UCMR 5 for which a drinking water method has been validated by the Administrator and that are not subject to a NPDWR



Sampling and Statistical Design

- Design vetted with stakeholders, peer reviewed and undergone four rounds of public comment
- Data Quality Objectives for the Representative Sample
 - Provides occurrence data for unbiased national exposure estimates
 - The statistical design:
 - Stratifies by system size and source water type
 - Allocates PWSs across the strata proportional to population served with at least two PWSs allocated to each State

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Selection of Nationally Representative PWSs

The document "Selection of Nationally Representative Public Water Systems for the Unregulated Contaminant Monitoring Rule: 2020 Update" is available in the docket

- Updates the 2001 statistical design document
- Describes:
 - Refinement to the UCMR program monitoring tiers
 - Selection of representative PWSs for Assessment Monitoring and Survey Monitoring
 - Changes in statistical design to address the AWIA requirements
 - Development of State Monitoring Plans that identify specific PWSs participating in the UCMR and establish sampling schedules

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PWS Types

- **PWS:** provides water for human consumption through pipes or other constructed conveyances to at least 15 service connections or serves an average of at least 25 people for at least 60 days a year
 - **Community Water System (CWS)**
 - PWS that supplies water to the same population year-round
 - **Non-Transient Non-Community Water System (NTNCWS)**
 - PWS that supplies water to at least 25 of the same people at least six months per year but not year-round (e.g., schools)
 - **Transient Non-Community Water System (TNCWS) (not generally included in UCMR sampling)**
 - PWS that provides water where people do not remain for long periods of time (e.g., gas stations, campgrounds)

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UCMR Monitoring Tiers

- UCMR approach relies on using one or more of 3 monitoring tiers:
 - Assessment Monitoring (primary approach to-date)
 - Screening Survey
 - Pre-Screen Testing
- Based on:
 - Availability and complexity of analytical methods
 - Laboratory capacity
 - Sampling frequency
 - Characteristics of PWSs performing the monitoring
 - Other considerations (e.g., cost/burden)
- Assessment Monitoring is the only tier proposed for UCMR 5

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Assessment Monitoring

- Primary design objective is to determine national contaminant occurrence in PWS-supplied drinking water for the purpose of estimating national population exposure
- Primary tier and largest in scope
- Generally relies on analytical methods that use more common techniques and are expected to be widely available
- Consistent with the AWIA provisions, Assessment Monitoring proposed for UCMR 5 includes:
 - Nationally representative sample of 800 small systems serving fewer than 3,300 persons
 - Census of small systems serving between 3,300 and 10,000 persons
 - Census of large systems serving > 10,000 persons
- Sampling design is population weighted
- **Total number of systems: ~10,300**

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UCMR 5 Applicability to PWSs per AWIA

System ¹ Size (# of people served)	National Sample: Assessment Monitoring Design	Total # of Systems per Size Category
Small Systems (25 – 3,299)	800 randomly selected systems (CWSs and NTNCWSs)	800
Small Systems (3,300 – 10,000)	All systems (CWSs and NTNCWSs)	~5,100
Large Systems (10,001 and over)	All systems (CWSs and NTNCWSs)	~4,400
TOTAL		~10,300

¹ Systems provide water for human consumption through pipes or other constructed conveyances to at least 15 service connections or serves an average of at least 25 people for at least 60 days a year

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Sampling Schedules

- EPA initially drafts schedules for large and small PWSs
- Partnered State has opportunity to review and modify schedules for large and small PWSs
- Large PWS has opportunity to review and modify their schedule
- Small PWS may request that EPA modify their schedule

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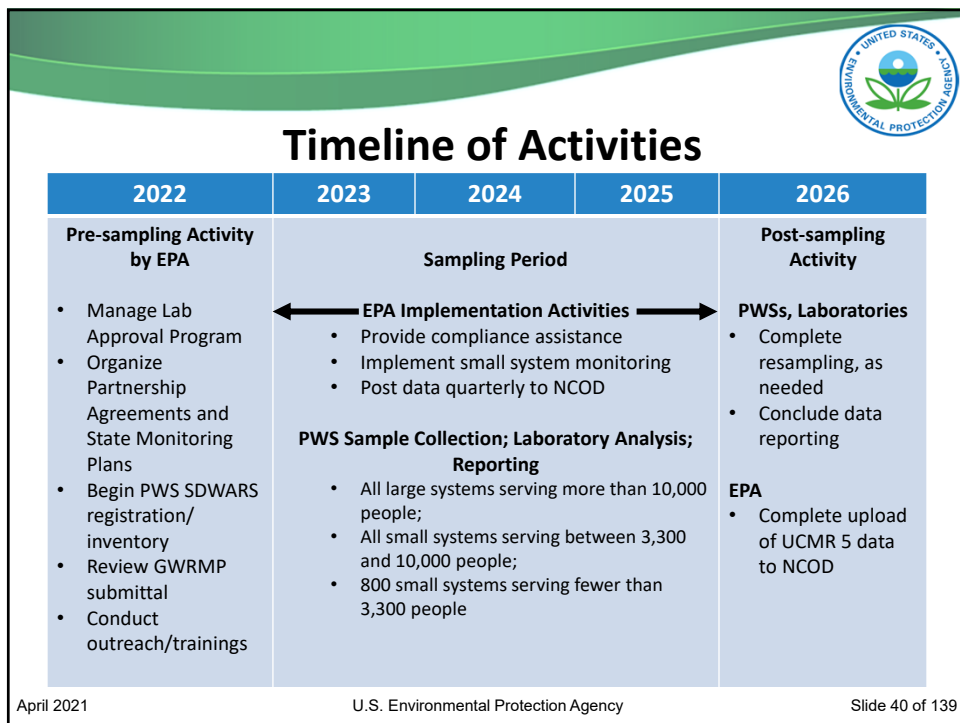
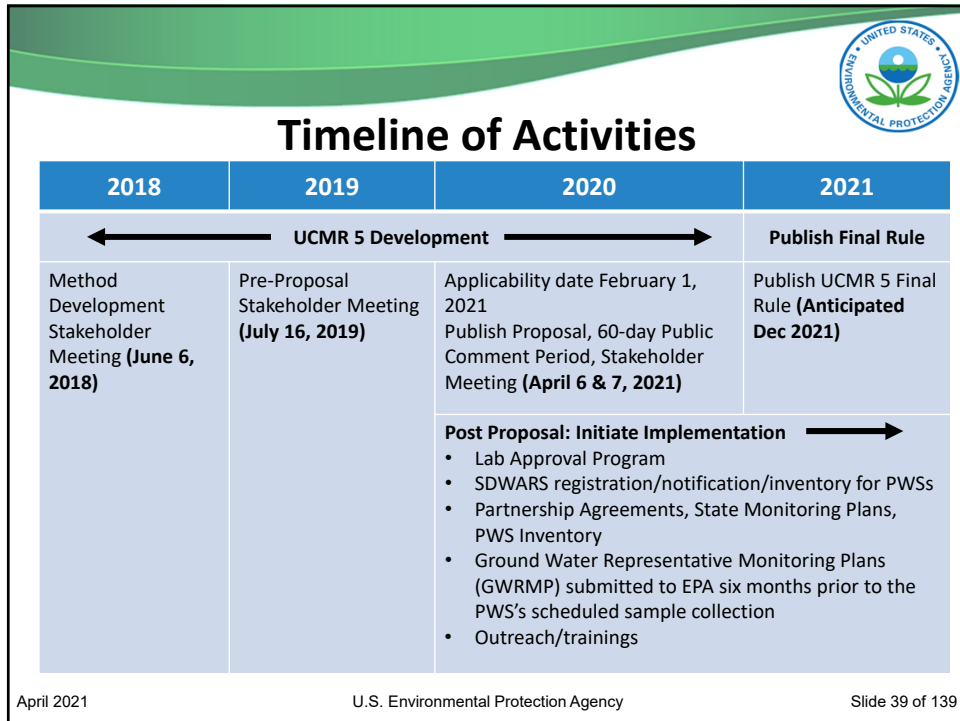
Sampling Frequency & Locations

- The UCMR 5 proposal identifies sampling frequencies and locations consistent with those used in UCMR 1 – UCMR 4
 - **Surface Water** systems (including those using ground water under the direct influence of surface water) sample four times (~3 months apart) during their year of sampling
 - **Ground Water** systems sample two times (5-7 months apart) during their year of sampling
- Sampling is proposed at the entry points to the distribution systems (EPTDSs)

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EPA Implementation Roles

- Small PWS support:
 - Maintain lab and implementation contracts to support the UCMR
 - Compile contact and inventory information
 - Manage sample kit distribution and tracking
 - Responsible for data review and reporting
- Large and Small PWS support:
 - Extract data from the Safe Drinking Water Accession and Review System (SDWARS) for evaluation and reporting to the National Contaminant Occurrence Database for Drinking Water (NCOD)
 - Support the SDWARS reporting system and users
 - Perform inventory and schedule updates
 - Provide technical assistance
 - Use SDWARS for real-time communication and outreach

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EPA Implementation Roles (Cont.)

- State, PWS, and Laboratory support:
 - Review and track PWS applicability and sampling progress
 - Coordinate Laboratory Approval Program
 - Provide technical support
 - Coordinate outreach
 - Compliance assistance and enforcement efforts

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Extended UCMR Implementation Team

- EPA Office of Ground Water and Drinking Water (OGWDW)
 - Lead organization for direct-implementation of rule
- EPA Regional Offices
 - Coordinate State Partnership Agreements
 - Assist States and PWSs with UCMR requirements, compliance assistance, and enforcement
- Partnering States
 - Support various aspects of implementation based on state-specific interest

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States' Role in the UCMR Program

- Participation by States is voluntary and documented via Partnership Agreements
- States help the EPA implement the UCMR program; help to ensure high data quality
- Partnership Agreement activities can include any/all of the following:
 - Review and revise State Monitoring Plans
 - Provide inventory and contact information for small and large PWSs
 - Review proposed Ground Water Representative Monitoring Plans (GWRMPs)
 - Provide compliance assistance (e.g., notify and instruct systems)
 - Collect samples
 - Other

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EPA Responsibilities on behalf of Small PWSs

- EPA funds costs associated with analyses and shipping for small PWSs (i.e., those serving 10,000 or fewer people)
- EPA engages States and PWSs to collect samples
- EPA coordinates sample analyses with contracted laboratories and funds the analyses
- EPA examines the results along with quality control (QC) data and makes results available via SDWARS

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Large PWS Responsibilities

- PWSs serving more than 10,000 people are responsible for the costs associated with analyses
- PWS coordinates sample analyses with an approved laboratory
- Laboratories post the data to SDWARS
- PWS reviews and can act upon (e.g., approve) data in SDWARS
- States have access to results following large PWS review period

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UCMR 5 Cost Estimates

Estimated Average Annual Costs of the Proposed UCMR 5 Over the Five-year Cycle¹

Entity	Avg. Annual Cost (Million) (2022-2026) ²
Small Systems (25-10,000), including labor ³ only (non-labor costs ⁴ paid for by the EPA)	\$0.3
Large Systems (10,001-100,000), including labor and non-labor costs	\$7.2
Very Large Systems (100,001 and greater), including labor and non-labor costs	\$2.3
States, including labor costs related to implementation coordination	\$0.8
EPA, including labor for implementation and non-labor for small system testing	\$10.5
AVERAGE ANNUAL NATIONAL TOTAL (over the period of 2022-2026)	\$21.1

1. Based on the scope of small-system monitoring described in AWIA.
2. Totals may not equal the sum of components due to rounding.
3. Labor costs pertain to systems, States, and EPA. Costs include activities such as reading the rule, notifying systems selected to participate, sample collection, data review, reporting, and record keeping.
4. Non-labor costs will be incurred primarily by EPA and by large and very large PWSs. They include the cost of shipping samples to laboratories for testing and the cost of the laboratory analyses.

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UCMR 5 Proposed Contaminants and Analytical Methods

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 Standards and Risk Management Division
 Technical Support Center

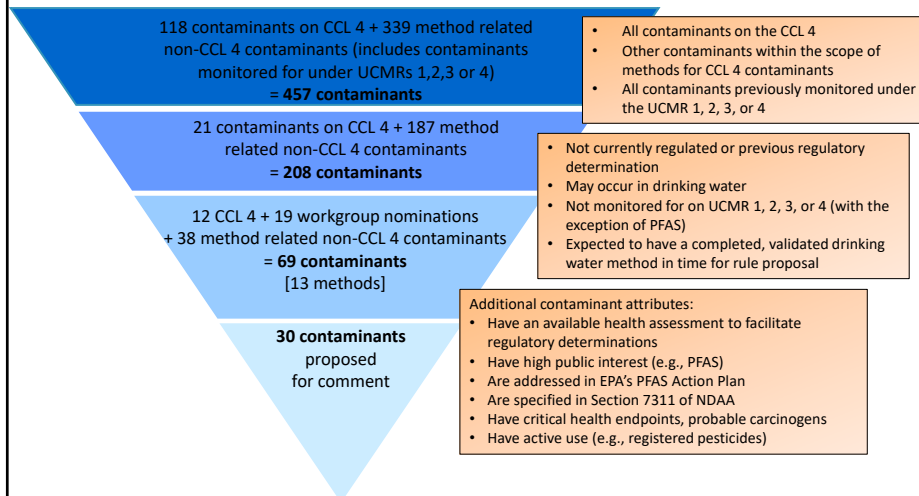


Overview

- Candidate selection process and rationale
- Proposed contaminants and analytical methods
- Health and occurrence data sources
- Contaminant-specific information by method
- Other contaminants considered during development of UCMR 5 proposal
- Information Compendium



Prioritization Process





PFAS as UCMR 5 Candidate Contaminants

- National Defense Authorization Act for Fiscal Year 2020 (NDAA) (Public Law 116-92)**
 - “The EPA Administrator shall include each PFAS in UCMR 5 for which a drinking water method has been validated by the Administrator and that are not subject to a NPDWR”
- EPA’s 2019 Per- and Polyfluoroalkyl Substances (PFAS) Action Plan:**
<https://www.epa.gov/pfas/epas-pfas-action-plan>
 - UCMR 5 Commitment:** The EPA will propose nationwide drinking water monitoring for PFAS under the next UCMR monitoring cycle utilizing newer methods available to detect more PFAS chemicals and at lower minimum reporting levels (MRLs) than previously possible in earlier monitoring
- Proposal included all 29 PFAS that are within the scope of EPA Methods 533 and 537.1. Six of the 29 PFAS were part of UCMR 3. UCMR 5 monitoring for those six would involve lower MRLs

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Proposed UCMR 5 Contaminants: 29 PFAS + lithium

EPA Method 533	
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	4,8-dioxa-3H-perfluorononanoic acid (ADONA)
1H, 1H, 2H, 2H-perfluorohexane sulfonic acid (4:2 FTS)	Hexafluoropropylene oxide dimer acid (HFPO-DA) (GenX)
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	Perfluorobutanesulfonic acid (PFBS)
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	Perfluorodecanoic acid (PFDA)
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	Perfluorododecanoic acid (PFDoA)
Perfluoro-3-methoxypropanoic acid (PFMPA)	Perfluoroheptanoic acid (PFHpA)
Perfluoro-4-methoxybutanoic acid (PFMBA)	Perfluorohexanoic acid (PFHxA)
Perfluorobutanoic acid (PFBA)	Perfluorohexanesulfonic acid (PFHxS)
Perfluoroheptanesulfonic acid (PFHpS)	Perfluorononanoic acid (PFNA)
Perfluoropentanesulfonic acid (PFPeS)	Perfluorooctanesulfonic acid (PFOS)
Perfluoropentanoic acid (PFPeA)	Perfluorooctanoic acid (PFOA)
11-chloroicosafafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	Perfluoroundecanoic acid (PFUnA)
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	
PFAS Analytes Unique to EPA Method 537.1	
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	Perfluorotetradecanoic acid (PFTA)
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	Perfluorotridecanoic acid (PFTrDA)
EPA Method 200.7 or alternate SM 3120 B or ASTM D1976-20	
Lithium	

Bold= PFAS monitored under UCMR 3



EPA Health Assessment Data Sources

- The Health Values are:
 - Not *federally* enforceable
 - Subject to change as health effects information becomes available
- Office of Research and Development
 - Integrated Risk Information System (IRIS)
https://cfpub.epa.gov/ncea/iris_drafts/AtoZ.cfm
 - Provisional Peer-Reviewed Toxicity Values (PPRTVs)
<https://www.epa.gov/pprtv/provisional-peer-reviewed-toxicity-values-pprtvs-assessments>
- Office of Water
 - Health Advisory (HA) or Health Effects Support Documents (HESD)
<https://www.epa.gov/dwstandardsregulations/drinking-water-contaminant-human-health-effects-information>

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Non-EPA Health Data Sources

- Available non-EPA health assessments were also considered, e.g.:
 - Agency for Toxic Substances and Disease Registry (ATSDR)
 - Toxicological Profiles
<https://www.atsdr.cdc.gov/toxprofiledocs/index.html>
 - World Health Organization (WHO)
 - International Agency for Research on Cancer (IARC) Monographs
<https://monographs.iarc.fr/>
 - Health Canada
 - Guidelines for Canadian Drinking Water Quality
https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality.html#tech_doc
 - Center for Disease Control and Prevention's
 - Morbidity and Mortality Weekly Reports (MMWR)
<https://www.cdc.gov/mmwr/index.html>

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Occurrence Data Sources

Finished Water Data

- Unregulated Contaminant Monitoring Rule (UCMR) (UCMR 3) (2013-2015)
- National Inorganics and Radionuclides Survey (NIRS) (1984 – 1986)
- Disinfection Byproduct Information Collection Rule (DBP-ICR) Data (1997 – 1998)
- State and Local Occurrence Studies

Supplemental Drinking Water and Ambient Water Data

- U.S. Geological Survey (USGS), Ambient Water
 - National Water-Quality Assessment Program (NAWQA)

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Other Data Sources

- Persistent, Bioaccumulative and Toxic (PBT) Profiler
- Chemical Data Reporting (CDR) under the Toxic Substance Control Act (TSCA)
- Interstate Technology Regulatory Council (ITRC)
- EPA's CompTox Chemicals Dashboard
- Hazardous Substances Data Bank (HSDB)

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Per- and Polyfluorinated Alkyl Substances


EPA Method 533¹ (SPE LC/MS/MS)

Location: EPTDS

Analyte	Health Information	Critical Health Effect	Occurrence
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	No EPA health assessment	NA	No occurrence data available in the data sources reviewed
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	No EPA health assessment	NA	No occurrence data available in the data sources reviewed
1H, 1H, 2H, 2H-perfluorohexane sulfonic acid (4:2 FTS)	No EPA health assessment	NA	No occurrence data available in the data sources reviewed
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	No EPA health assessment	NA	No occurrence data available in the data sources reviewed

1. Determination of Per- and Polyfluoroalkyl Substances in Drinking Water by Isotope Dilution Anion Exchange Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry. November 2019.

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Per- and Polyfluorinated Alkyl Substances


EPA Method 533 (SPE LC/MS/MS)

Location: EPTDS

Analyte	Health Information	Critical Health Effect	Occurrence
4,8-dioxa-3H-perfluorononanoic acid (ADONA) ¹	No EPA health assessment	NA	No occurrence data available in the data sources reviewed
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	No EPA health assessment	NA	No occurrence data available in the data sources reviewed
hexafluoropropylene oxide dimer acid (HFPO-DA) (GenX)	2018 Draft EPA Toxicity Values ² : Draft Candidate Chronic Reference Dose (RfD) = 0.00008 mg/kg-day Draft Candidate Subchronic RfD = 0.0002 mg/kg-day	NA	No occurrence data available in the data sources reviewed

1. 4,8-dioxa-3H-perfluorononanoic acid is the parent acid form of the ammonium salt
2. Draft EPA Toxicity Assessment, 2018

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Per- and Polyfluorinated Alkyl Substances

EPA Method 533 (SPE LC/MS/MS)

Location: EPTDS

Analyte	Health Information	Critical Health Effect	Occurrence
nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	No EPA health assessment	NA	No occurrence data available in the data sources reviewed
perfluoro (2-ethoxyethane) sulfonic acid (PFESA)	No EPA health assessment	NA	No occurrence data available in the data sources reviewed
perfluoro-3-methoxypropanoic acid (PFMPA)	No EPA health assessment	NA	No occurrence data available in the data sources reviewed
perfluoro-4-methoxybutanoic acid (PFMBA)	No EPA health assessment	NA	No occurrence data available in the data sources reviewed

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Per- and Polyfluorinated Alkyl Substances


EPA Method 533 (SPE LC/MS/MS)

Location: EPTDS

Analyte	Health Information	Critical Health Effect	Occurrence
perfluorobutanesulfonic acid (PFBS)	EPA PPRTV ¹ 2014: Chronic Provisional Reference Dose (p-RfD) = 0.02 mg/kg-day; Subchronic p-RfD = 0.2 mg/kg-day Draft EPA Toxicity Values, 2018 ² : Draft Candidate Chronic RfD = 0.01 mg/kg-day (thyroid or kidney) Draft Candidate Subchronic RfD = 0.04 (thyroid) and 0.1 mg/kg-day (kidney)	Increased incidence of kidney hyperplasia	UCMR 3 ³ : Detected in 0.16% of PWSs at concentrations greater than or equal to 0.09 ug/L (Minimum Reporting Level [MRL]). Boone et al., 2019 ⁴ : Detected in 96% of partially treated samples from 25 PWSs; median detected 0.00117 ug/L
perfluorobutanoic acid (PFBA)	EPA Integrated Risk Information System (IRIS) assessment in process	NA	Boone et al., 2019: Detected in 88% of partially treated samples from 25 PWSs; median detected 0.00362 ug/L
perfluorodecanoic acid (PFDA)	EPA IRIS assessment in process	NA	Boone et al., 2019: Detected in 52% of partially treated samples from 25 PWSs; median detected 0.00033 ug/L.

1. EPA Provisional Peer-Reviewed Toxicity Value (PPRTV), 2014
 2. Draft EPA Toxicity Assessment, 2018
 3. UCMR 3, 2013-2015: Finished drinking water occurrence data
 4. Finished drinking water occurrence study. "Per- and polyfluoroalkyl substances in source and treated drinking waters of the United States." *Science of the Total Environment* 653 (February 25):359-369.

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Per- and Polyfluorinated Alkyl Substances

EPA Method 533 (SPE LC/MS/MS)


Location: EPTDS

Analyte	Health Information	Critical Health Effect	Occurrence
perfluorododecanoic acid (PFDoA)	No EPA health assessment	NA	Boone et al., 2019 ¹ : Detected in 4% of partially treated samples from 25 PWSs; median detected 0.00009 ug/L
perfluoroheptanesulfonic acid (PFHpS)	No EPA health assessment	NA	No occurrence data available in the data sources reviewed
perfluoroheptanoic acid (PFHpA)	No EPA health assessment	NA	UCMR 3 ² : Detected in 1.75% of PWSs at greater than or equal to 0.01 ug/L (MRL) Boone et al., 2019: Detected in 92% of partially treated samples from 25 PWSs; median detected 0.00079 ug/L

1. Finished drinking water occurrence study. "Per- and polyfluoroalkyl substances in source and treated drinking waters of the United States." *Science of The Total Environment* 653 (February 25):359-369

2. UCMR 3, 2013-2015: Finished drinking water occurrence data

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Per- and Polyfluorinated Alkyl Substances

EPA Method 533 (SPE LC/MS/MS)


Location: EPTDS

Analyte	Health Information	Critical Health Effect	Occurrence
perfluorohexanesulfonic acid (PFHxS)	Draft ATSDR ¹ , 2018: provisional Minimal Risk Level = 0.00002 mg/kg-day (intermediate duration) EPA IRIS assessment in process	Thyroid follicular cell damage	UCMR 3 ² : Detected in 1.12% of PWSs at greater than or equal to 0.03 ug/L (MRL) Boone et al., 2019 ³ : Detected in 80% of partially treated samples from 25 PWSs; median detected 0.00079 ug/L
perfluorohexanoic acid (PFHxA)	EPA IRIS assessment in process	NA	Boone et al., 2019: Detected in 100% of partially treated samples from 25 PWSs; median detected 0.00143 ug/L
perfluorononanoic acid (PFNA)	Draft ATSDR, 2018: provisional Minimal Risk Level = 0.000003 mg/kg-day (intermediate duration) EPA IRIS assessment in process	Decreased pup body weight and developmental delays	UCMR 3: Detected in 0.28% of PWSs at greater than or equal to 0.02 ug/L (MRL) Boone, et al., 2019: Detected in 88% of partially treated samples from 25 PWSs; median detected 0.00074 ug/L

1. Draft Agency for Toxic Substances and Disease Registry (ATSDR), 2018: "Toxicological Profile for Perfluoroalkyls"

2. UCMR 3, 2013-2015: Finished drinking water occurrence data

3. Finished drinking water occurrence study. "Per- and polyfluoroalkyl substances in source and treated drinking waters of the United States." *Science of The Total Environment* 653 (February 25):359-369



Per- and Polyfluorinated Alkyl Substances


EPA Method 533 (SPE LC/MS/MS)

Location: EPTDS

Analyte	Health Information	Critical Health Effect	Occurrence
perfluorooctanesulfonic acid (PFOS)	EPA HA ¹ : 0.07 ug/L (chronic) EPA HESD ² , 2016: RfD = 0.00002 mg/kg-day Health Canada, 2018 ³ : MAC = 0.6 ug/L	Reduced pup body weight in the two-generation study in rats	UCMR 3 ⁴ : Detected in 1.93% of PWSs at greater than or equal to 0.04 ug/L (MRL) Boone et al., 2019 ⁵ : Detected in 80% of partially treated samples from 25 PWSs; median detected 0.00162 ug/L
perfluorooctanoic acid (PFOA)	EPA HA ¹ : 0.07 ug/L (chronic) EPA HESD ² , 2016: RfD= 0.00002 mg/kg-day; 10 ⁻⁴ Cancer Risk = 50 ug/L Health Canada, 2018 ³ : MAC = 0.2 ug/L	Pup reduced ossification and accelerated male puberty, decreased antibody protection and increased adult kidney weight with decreased body weight	UCMR 3: Detected in 2.38% of PWSs at greater than or equal to 0.02 ug/L (MRL) Boone et al., 2019: Detected in 76% of partially treated samples from 25 PWSs; median detected 0.00415 ug/L

1. EPA Health Advisory for PFOA and PFOS, 2016; Non-cancer health value; Not federally enforceable
 2. EPA Health Effects Support Document (HESD); Not federally enforceable
 3. Health Canada Guidelines for Canadian Drinking Water Quality, Maximum Acceptable Concentration (MAC); Not federally enforceable
 4. UCMR 3, 2013-2015: Finished drinking water occurrence data
 5. Finished drinking water occurrence study. "Per- and polyfluoroalkyl substances in source and treated drinking waters of the United States." *Science of The Total Environment* 653 (February 25):359-369"

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Per- and Polyfluorinated Alkyl Substances


EPA Method 533 (SPE LC/MS/MS)

Location: EPTDS

Analyte	Health Information	Critical Health Effect	Occurrence
perfluoropentanesulfonic acid (PFPeS)	No EPA health assessment	NA	No occurrence data available in the data sources reviewed
perfluoropentanoic acid (PFPeA)	No EPA health assessment	NA	Boone et al., 2019 ¹ : Detected in 96% of partially treated samples from 25 PWSs; median detected 0.00178 ug/L
perfluoroundecanoic acid (PFUnA)	No EPA health assessment	NA	Boone et al., 2019: Detected in 16% of partially treated samples from 25 PWSs; median detected 0.00054 ug/L Quiñones and Snyder, 2009 ² : The mean concentration detected in 1 of 7 PWSs with varying degrees of wastewater impact 0.0019 ug/L (Detects are concentrations greater than or equal to a method reporting limit of 0.001 ug/L)

1. Finished drinking water occurrence study. "Per- and polyfluoroalkyl substances in source and treated drinking waters of the United States." *Science of The Total Environment* 653 (February 25):359-369
 2. Finished drinking water occurrence study. "Occurrence of perfluoroalkyl carboxylates and sulfonates in drinking water utilities and related waters from the United States." *Environmental Science & Technology* 43(24): 9089- 9095.

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Per- and Polyfluorinated Alkyl Substances


Using EPA Method 537.1¹ (LC/MS/MS)

Location: EPTDS

Analyte	Health Information	Critical Health Effect	Occurrence
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	No EPA health assessment	NA	No occurrence data available in the data sources reviewed
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	No EPA health assessment	NA	No occurrence data available in the data sources reviewed
Perfluorotetradecanoic acid (PFTA)	No EPA health assessment	NA	Boone et al., 2019 ² : Detected in 0% of partially treated samples from 25 PWSs.
Perfluorotridecanoic acid (PFTrDA)	No EPA health assessment	NA	Boone et al., 2019: Detected in 0% of partially treated samples from 25 PWSs.

1. Determination of Selected Per- and Polyfluorinated Alkyl Substances in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS), Version 2.0. March 2020.
 2. Finished drinking water occurrence study. "Per- and polyfluoroalkyl substances in source and treated drinking waters of the United States." *Science of The Total Environment* 653 (February 25):359-369

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Lithium (Metal/Pharmaceutical)

EPA Method 200.7¹ (ICP-AES)

Location: EPTDS

Analyte	Health Information	Critical Health Effect	Occurrence
Lithium	EPA PPRTV, 2008 ² : p-RFD = 0.002 mg/kg-day (Chronic and Subchronic); lower bound of the therapeutic serum concentration range selected as basis	Adverse effects in several organs and systems (e.g., kidney effects)	NIRS ³ : Detected in 551 of 988 (55.8%) PWSs; detection range 5-7,929 ug/L Glassmeyer et al., 2017 ⁴ : Detected in 56% of partially treated samples from 25 PWSs (mostly surface water systems); median detected 10.8 µg/L

1. Determination of Metals and Trace Elements in Water and Wastes by Inductively Coupled Plasma-Atomic Emission Spectrometry, Revision 4.4. 1994
 2. EPA Provisional Peer-Reviewed Toxicity Value (PPRTV), 2008
 3. National Inorganics and Radionuclides Survey (NIRS), 1984-1986: Finished drinking water occurrence data
 4. Finished drinking water occurrence study. "Nationwide Reconnaissance of Contaminants of Emerging Concern in Source and Treated Drinking Waters of the United States." *Science of the Total Environment* (581-582):909-922.

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Other Contaminants Considered

- EPA considered four haloacetonitriles and *Legionella pneumophila* for UCMR 5 monitoring but did not propose them for the reasons described in the *Federal Register* Notice
- EPA is examining opportunities to enhance protection against disinfection byproducts (including haloacetonitriles) and *Legionella pneumophila* through potential revisions to the suite of Microbial and Disinfection Byproduct (MDBP) rules, including the Surface Water Treatment Rule
- EPA took into consideration that UCMR 5 data collection would not be complete in time to inform regulatory revision to the MDBP rules (an anticipated proposal date of July 31, 2024 and a final rule date of September 30, 2027) and would not reflect conditions in water systems after any regulatory revisions become effective

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Other Contaminants Considered

- Inclusion of haloacetonitriles and/or *Legionella pneumophila* in UCMR 5 would pose monitoring and reporting complexity and cost compared to the sampling design for PFAS and lithium
 - Haloacetonitriles: new expense estimates of \$16 million for large PWSs, \$20 million for EPA [to implement small system monitoring], and \$0.5 million for small PWSs and States over the 5-year UCMR period
 - *Legionella pneumophila*: new expense estimates of \$11 million for large PWSs, \$20 million for EPA [to implement small system monitoring], and \$0.5 million for small PWSs and States over the 5-year UCMR period

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Other Contaminants Considered

EPA Method 551.1 (LLE/GC/ECD)¹

Location: Distribution System

Analyte	Health Information	Critical Health Effect	Occurrence
Bromochloroacetonitrile (BCAN)	Christ et al., 1995 ² : Maternal no-observed-adverse-effect level (NOAEL) of 45 mg/kg/day and maternal lowest-observed-adverse-effect level (LOAEL) of 65 mg/kg/day in rats when BCAN was administered in tricapyrylin; Maternal LOAEL of 5 mg/kg/day in rats, BCAN administered in tricapyrylin	Decreased maternal weight and increased dam mortality; Developmental and teratogenic effects	DBP-ICR ³ : Detected in 62.5% PWSs; 50th percentile = 0.7 ug/L, 90th percentile = 2.6 ug/L
Dichloroacetonitrile (DCAN)	Smith et al., 1986 ⁴ : LOAEL in rats of 55 mg/kg/day when DCAN was administered in tricapyrylin (based) Smith et al., 1989 ⁵ : Maternal and fetal NOAEL in rats of 15 mg/kg/day when DCAN was administered in tricapyrylin	Developmental toxicity Increased liver weight in the dams and decreased fetal weight and length and an increase in soft tissue malformations, respectively	DBP-ICR: Detected in 70.1% PWSs; 50th percentile = 1.3 ug/L, 90th percentile = 4.4 ug/L

1. Determination of Chlorination Disinfection Byproducts, Chlorinated Solvents, and Halogenated Pesticides/Herbicides in Drinking Water by Liquid-Liquid Extraction and Gas Chromatography with Electron-Capture Detection, Revision 1.0, 1995
2. The developmental toxicity of bromochloroacetonitrile in pregnant Long-Evans rats. *International Journal of Environmental Health Research* 5(2):175-188.
3. Disinfection Byproduct Information Collection Rule (DBP-ICR) Data (1997 – 1998): Distribution system occurrence data
4. "Reproductive toxicology of disinfection by-products." *Environmental Health Perspectives*. 69: 177-182.
5. "Developmental toxicity of dichloroacetonitrile: a by-product of drinking water disinfection." *Fundamental and Applied Toxicology*. 12(4): 765-772.

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Other Contaminants Considered

EPA Method 551.1 (LLE/GC/ECD)

Location: Distribution System

Analyte	Health Information	Critical Health Effect	Occurrence
Dibromoacetonitrile (DBAN)	WHO, 2004 TDI ¹ : 0.11 mg/kg/day WHO, 1999 IARC ² Cancer Classification: Possibly carcinogenic to humans (Group 2B)	Decreased body weight in male rats	DBP-ICR ³ : Detected in 48.6% PWSs; 50th percentile = <0.5 ug/L, 90th percentile = 2.3 ug/L
Trichloroacetonitrile (TCAN)	Christ et al., 1996 ⁴ : NOAEL in rats of 35 mg/kg/day and a LOAEL of 55 mg/kg/day when TCAN was administered in corn oil WHO, 1999 IARC Cancer Classification: Not classifiable as to its carcinogenicity to humans (Group 3)	Developmental toxicity and teratogenicity	DBP-ICR: Detected in 1.7% PWSs; 50th percentile = <0.5 ug/L, 90th percentile = <0.5 ug/L

1. World Health Organization (WHO), Tolerable Daily Intake (TDI)
2. International Agency for Research on Cancer (IARC)
3. Disinfection Byproduct Information Collection Rule (DBP-ICR) Data (1997 – 1998): Distribution system occurrence data
4. "Developmental effects of trichloroacetonitrile administered in corn oil to pregnant Long-Evans rats." *Journal of Toxicology and Environmental Health* 47(3):233-47.

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Other Contaminants Considered

Method TBD			
Location: Distribution System			
Analyte	Health Information	Critical Health Effect	Occurrence
<i>Legionella pneumophila</i>	MCLG ¹ = 0	Legionellosis, which can be Legionnaires' disease (a form of pneumonia; potentially fatal illness) or Pontiac Fever (a milder, flu-like illness)	Donohue et al., 2019 ² : Between 2011 and 2017, 358 tap water samples were collected from 46 U.S. States and territories. Legionella was detected in 26% of chlorinated tap water samples and 22% of chloraminated tap water samples. There was no significant difference in detection frequency in hot-water or cold-water tap samples whether from chlorine- or chloramine-treated water sources
<p>1. <i>Legionella pneumophila</i> is regulated via "treatment technique" with a Maximum Contaminant Level Goal (MCLG) of zero established under EPA's Surface Water Treatment Rule (54 FR 27486, June 1989)</p> <p>2. Donohue et al., 2019: Finished drinking water occurrence study. "Impact on the Detection and Quantification of Legionella pneumophila and Mycobacterium Species"</p>			
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Other Contaminants Considered

- **Total Organic Fluorine (TOF):** While there is high interest in TOF (and other techniques that might capture a broader suite of PFAS), the measurement approach is subject to significant technical challenges, and a robust method that would support national monitoring is unlikely to be ready in time to support UCMR 5 rulemaking
- **1,2,3-trichloropropane:** Included in UCMR 3. At 0.03 µg/L, the MRL established in UCMR 3 is higher than the EPA health reference level (HRL) associated with a cancer risk level of one cancer case per million people (0.0004 µg/L (0.4 ng/L), but lower than the cancer risk level associated with one cancer case per 10,000 people (0.04 µg/L)
 - Available analytical methods would not support the collection of data at concentrations lower than the levels monitored during UCMR 3




UCMR 5 Contaminants

- EPA invites public comments on:
 - The 30 proposed contaminants and their associated methods
 - The additional contaminants considered for UCMR 5, but not included on the proposed list
 - Additional contaminants that may not have been considered for UCMR 5
 - Additional consensus analytical methods for the proposed contaminants



Go to www.regulations.gov and enter Docket ID: EPA-HQ-OW-2020-0530 to submit public comments

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Information Compendium for Candidate Contaminants

- Provides supporting information for the 30 proposed contaminants, as well as *Legionella pneumophila* and four haloacetonitriles
- Used data sources from the Contaminant Candidate List (CCL) program to inform
 - Background & Use
 - Health Effects
 - Occurrence in Water
 - Production, Release, & Usage
 - Persistence & Mobility
- Outlines the contaminant prioritization process
- Summarizes the data sources reviewed
- Includes a comprehensive list of the other contaminants that were considered, but not included on the proposed list

The document "Information Compendium for Candidate Contaminants for the Proposed Unregulated Contaminant Monitoring Rule (UCMR 5)" is available in the docket

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Representative Samples (Optional)

Derek Losh, U.S. EPA
Office of Ground Water and Drinking Water
Standards and Risk Management Division
Technical Support Center



Overview

- Ground Water Representative Monitoring Plan (GWRMP) Program
 - Option for ground water systems to reduce monitoring
- Representative connections
 - Option for water systems that purchase water with multiple connections from the same wholesaler



Ground Water Representative Monitoring Plan (GWRMP) Program

- Applications from ground water systems now being accepted
- PWSs with multiple ground water entry points to the distribution system (EPTDSs) can sample at representative sampling locations rather than at each EPTDS with EPA approval
- Previously-approved plans may be used for UCMR 5 if there are no significant changes in the configuration of the ground water EPTDSs since prior approval
- PWSs must prepare proposals for any new GWRMPs and submit them to: UCMR_Sampling_Coordinator@epa.gov

The document "Instructions for Preparing a Ground Water Representative Monitoring Plan for the Unregulated Contaminant Monitoring Rule" is available in the docket

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GWRMP Program

Key GWRMP Proposal Requirements:

- **Site map** showing the locations of all wells and the proposed representative wells. Generally, represented wells should be located within a mile of the representative well
- Uniform **contamination susceptibility** among the represented wells and their representative well
- Historical **ground water quality data** demonstrating similarity among the represented wells and the representative well

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GWRMP Program

GWRMPs approved under prior UCMRs

- These may be used for UCMR 5 if there are no significant changes in the configuration of the ground water EPTDSs since prior approval. The PWS must send a message to UCMR_Sampling_Coordinator@epa.gov to confirm its intention to use the previous GWRMP
- If EPA does not have record of a previously-approved GWRMP, EPA will contact the PWS to request that documentation

Amending GWRMPs

- Requests for change must also be submitted to UCMR_Sampling_Coordinator@epa.gov
- If new wells are being added, the amendment request must be accompanied by the supporting information discussed on a previous slide



GWRMP Program: Change Between UCMR 4 and UCMR 5 Proposal

UCMR 4	UCMR 5 Proposed Change
UCMR 4 specifies “within 120 days from publication of the final rule” as the deadline to submit a GWRMP	As proposed, plans must be submitted to EPA six months prior to the PWS’s scheduled sample collection , instead of by a specified date

Reason for considering change: Provides greater flexibility for PWSs with ground water locations to complete the GWRMP process. Those scheduled to collect samples in 2024 or 2025 would have significantly more time



Representative Connections

- **Representative Connections:** Water systems that purchase water with multiple connections from the same wholesaler may select one representative connection from that wholesaler
 - Do not need EPA approval
 - Upload your representative connection to SDWARS

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UCMR 5 Reporting

Jillian Toothman, U.S. EPA
Office of Ground Water and Drinking Water
Standards and Risk Management Division
Technical Support Center



Overview

- SDWARS 5
- Reporting requirements
- Data elements
- Timing of reporting

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SDWARS 5

- Safe Drinking Water Accession and Review System (SDWARS) used by PWSs and EPA-approved UCMR 5 laboratories to report results
- Internet-based electronic reporting system that utilizes a secure access portal, the Central Data Exchange (CDX), to access SDWARS 5
- SDWARS 5 user instructions and trainings for labs, PWSs, and States will be available after the final rule is published

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Large System Reporting §141.35(c)

- Contact and zip code information
 - SDWARS by December 31, 2022
- Sampling location information
 - SDWARS by December 31, 2022
 - Changes after December 31, 2022 must be submitted to UCMR_Sampling_Coordinator@epa.gov and approved by EPA
- Data elements
 - PWSs must report all data elements specified in §141.35(e) Table 1 (e.g., disinfectant type and treatment information) to SDWARS
- Analytical results
 - Uploaded to SDWARS by the PWS' laboratory
 - Reviewed and submitted by PWS in SDWARS

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Small System Reporting §141.35(d)

- Contact and zip code information
 - SDWARS by December 31, 2022
- Sampling location information
 - SDWARS by December 31, 2022
- Data elements
 - PWSs must report all data elements specified in §141.35(e) Table 1 on each sample tracking form, in their sampling kit, as appropriate
- Analytical results
 - Uploaded to SDWARS by EPA's contracted laboratory
 - Reviewed by EPA in SDWARS
 - Small PWSs and states will have access to results via SDWARS

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Reporting Data Elements §141.35(e)

1. Public Water System Identification (PWSID) Code	15. Analytical Method Code
2. Public Water System Name	16. Extraction Batch Identification Code
3. Public Water System Facility Identification Code	17. Extraction Date
4. Public Water System Facility Name	18. Analysis Batch Identification Code
5. Public Water System Facility Type	19. Analysis Date
6. Water Source Type	20. Sample Analysis Type
7. Sampling Point Identification Code	21. Analytical Results—Sign
8. Sampling Point Name	22. Analytical Result—Measured Value
9. Sampling Point Type Code	23. Additional Value
10. Disinfectant Type (<i>Additional Details</i>)	24. Laboratory Identification Code
11. Treatment Information (<i>Additional Details</i>)	25. Sample Event Code
12. Sample Collection Date	26. Historical Information for Contaminant Detections and Treatment (<i>Additional Details</i>)
13. Sample Identification Code	27. Potential PFAS Sources (<i>Additional Details</i>)
14. Contaminant	28. Direct Potable Reuse Water Information (<i>Additional Details</i>)

Data elements PWS reports at sample collection

Updated data element

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Disinfectant Type - Data Element 10


All of the disinfectants/oxidants that have been added prior to and at the entry point to the distribution system. **Please select all that apply:**

- **PEMB** = Permanganate
- **HPXB** = Hydrogen peroxide
- **CLGA** = Gaseous chlorine
- **CLOF** = Offsite generated hypochlorite (stored as a liquid form)
- **CLON** = Onsite generated hypochlorite
- **CAGC** = Chloramine (formed with gaseous chlorine)
- **CAOF** = Chloramine (formed with offsite hypochlorite)
- **CAON** = Chloramine (formed with onsite hypochlorite)
- **CLDB** = Chlorine dioxide
- **OZON** = Ozone
- **ULVL** = Ultraviolet light
- **OTHD** = All other types of disinfectant/oxidant
- **NODU** = No disinfectant/oxidant used

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Treatment Information - Data Element 11

Treatment information associated with the sample point. **Please select all that apply.**

- **CON** = Conventional (non-softening, consisting of at least coagulation/sedimentation basins and filtration)
- **SFN** = Softening
- **RBF** = River bank filtration
- **PSD** = Pre-sedimentation
- **INF** = In-line filtration
- **DFL** = Direct filtration
- **SSF** = Slow sand filtration
- **BIO** = Biological filtration (operated with an intention of maintaining biological activity within filter)
- **UTR** = Unfiltered treatment for surface water source
- **GWD** = Groundwater system with disinfection only
- **PAC** = Application of powder activated carbon
- **GAC** = Granular activated carbon adsorption (not part of filters in CON, SFN, INF, DFL, or SSF)
- **AIR** = Air stripping (packed towers, diffused gas contactors)
- **POB** = Pre-oxidation with chlorine (applied before coagulation for CON or SFN plants or before filtration for other filtration plants)
- **MFL** = Membrane filtration
- **IEX** = Ionic exchange
- **DAF** = Dissolved air floatation
- **CWL** = Clear well/finished water storage without aeration
- **CWA** = Clear well/finished water storage with aeration
- **ADS** = Aeration in distribution system (localized treatment)
- **OTH** = All other types of treatment
- **NTU** = No treatment used
- **DKN** = Do not know

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Historical Information for Contaminant Detections and Treatment - Data Element 26

A yes or no answer provided by the PWS for each entry point to the distribution system

Question: Have you tested for the contaminant in your drinking water in the past?

- **YES** = If yes, did you modify your treatment and if so, what types of treatment did you implement? Select all that apply.
 - **PAC** = Application of powder activated carbon
 - **GAC** = Granular activated carbon adsorption (not part of filters in CON, SCO, INF, DFL, or SSF)
 - **Biologically Active Carbon**
 - **MFL** = Membrane filtration
 - **ULVL** = Ultraviolet light
 - **Other**
- **No** = have never tested for the contaminant
- **DK** = I do not know

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Potential PFAS Sources - Data Element 27

A yes or no answer provided by the PWS for each entry point to the distribution system

Question: Are you aware of any potential current and/or historical sources of PFAS that may have impacted the drinking water sources at your water system?

- **YES** = If yes, select all that apply:
 - **MB** = Military Base
 - **FT** = Firefighting training school
 - **AO** = Airport Operations
 - **CW** = Car Wash or Industrial Launderers
 - **PS** = Public Safety Activities (e.g., fire and rescue services)
 - **WM** = Waste Management
 - **HW** = Hazardous waste collection, treatment and disposal, Underground Injection Well
 - **SC** = Solid waste collection, combustors, incinerators
 - **MF** = Manufacturing
 - **FP** = Food Packaging
 - **TA** = Textile and Apparel (e.g., stain- and water-resistant, fiber/thread, carpet, house furnishings, leather)
 - **PP** = Paper
 - **CC** = Chemical
 - **PR** = Plastics and Rubber Products
 - **MM** = Machinery
 - **CE** = Computer and Electronic Products
 - **FM** = Fabricated Metal Products (e.g., nonstick cookware)
 - **PC** = Petroleum and Coal Products
 - **FF** = Furniture
 - **OG** = Oil and Gas Production
 - **UT** = Utilities (e.g., sewage treatment facilities)
 - **CT** = Construction (e.g., wood floor finishing, electrostatic painting)
 - **OT** = Other
- **No** = I am not aware of any potential current and/or historical sources
- **DK** = I do not know

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Direct Potable Reuse Water Information – Data Element 28

A yes or no answer provided by the PWS for each entry point to the distribution system

Question: Do you use direct potable reuse as a source of water?

Yes = If yes, what is the blending ratio when used?
Enter blending ratio at sample point

No = do not use direct potable reuse water

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Timing of Reporting: Change Between UCMR 4 and UCMR 5 Proposal

- Adjust the number of days between sample collection and laboratory posting of data and adjust the number of days for PWS review of data posted by their laboratory (**40 CFR 141.40(c)(6)(ii) Reporting Schedule and 40 CFR 141.40(a)(5)(vi) Reporting**)

UCMR 4	UCMR 5 Proposed Change
Specifies that laboratories must approve analytical results in EPA's electronic data reporting system within 120 days from the sample collection date and specifies that PWS have 60 days (from when the laboratory posted the data to EPA's electronic data reporting system) to review, approve, and submit their data to the State and EPA	Laboratories would have 90 days from the sample collection date to post and approve analytical results in SDWARS for PWS review. Large PWSs would have 30 days to review and approve the analytical results posted to SDWARS

- Reason for Change:** States and other stakeholders have expressed interest in earlier access to results. Laboratories and PWSs have demonstrated that shorter periods are practical.

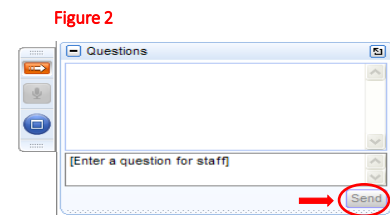
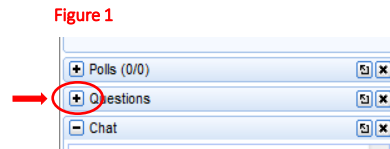


**Break
(15 minutes)**



Questions on the Presentation

- Click on “+” next to “Questions” in the control panel (Figure 1) to submit questions/comments
 - Type a question in the box; click send (Figure 2)
- Submit general clarifying questions throughout the webinar
 - Questions will be answered in the chat box throughout the presentation
 - Common questions will be answered at the end of each section



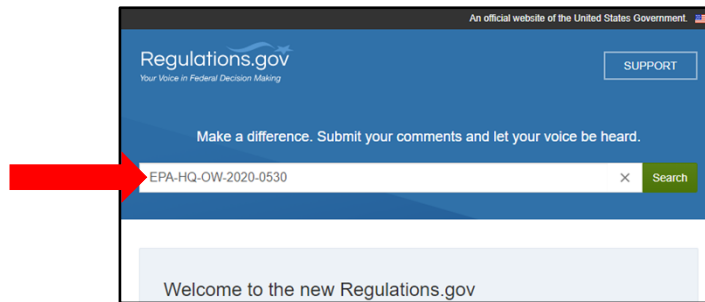
Specific Public Water System & Laboratory Questions about UCMR 5

- Public Water System (PWS)-Specific Questions
 - [UCMR Sampling Coordinator@epa.gov](mailto:UCMR_Sampling_Coordinator@epa.gov)
 - “My water system has five entry points, but we share three of those points with another water system. Where do I sample?”
- Laboratory-Specific Questions
 - [UCMR Lab Approval@epa.gov](mailto:UCMR_Lab_Approval@epa.gov)
 - “My laboratory merged with another laboratory since the last UCMR cycle, can we change our laboratory ID?”



Comments on the UCMR 5 Proposed Rule

- Go to <http://www.regulations.gov>
- Enter Docket ID EPA-HQ-OW-2020-0530
- Click **Search** button



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Comment Process/Accessing Docket

- The UCMR 5 docket should pop up on the next screen
- Click on the **Comment** button below the Proposed Rule



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Comment Process/Accessing Docket

- Enter comment and all required information on next screen
- Upload a document by clicking on the **Browse...** button
- Click on the **Submit Comment** button at the bottom of the page

A screenshot of the "Write a Comment" form. At the top, it says "Write a Comment" with links for "Read Agency Guidelines" and "Commenter's Checklist". Below is a "Comment*" text area with the placeholder "Start typing comment here..." and a character count of "5000". Underneath is an "Attach Files" section with a note: "You can attach up to 20 files, but each file cannot exceed 10MB. Valid file types include: bmp, docx, gif, jpeg, pdf, png, pptx, rtf, sgm, tif, tiff, txt, wpd, xlsx, xml." At the bottom of the attachment area, there is a "Drop files here or" label and a "Browse..." button, which is circled in red.

Comment Process/Accessing Docket

- Once submitted, comments cannot be edited or removed
- Do not electronically submit any information you consider to be Confidential Business Information (CBI)
- Multimedia submissions (audio, video, etc.) must be accompanied by a written comment
 - Written comment is considered the official comment and should include discussion of all points you wish to make
- EPA public comment policy is at:
<http://www.epa.gov/dockets/commenting-epa-dockets>
- **Comments/questions/statements raised during this meeting are not registered as official public comments**



Process for EPA Approval of Laboratories Supporting UCMR 5

Paul Grimmatt, U.S. EPA
Office of Ground Water and Drinking Water
Standards and Risk Management Division
Technical Support Center



Overview

- Laboratory Approval Program
 - General expectations
 - Contracts for small system sample analysis
 - Laboratory approval procedure
- Laboratory Approval Manual
- Maintaining Approval
- Minimum Reporting Levels (MRLs)

For additional information, the document "UCMR 5 Laboratory Approval Manual" is available in the docket



General Expectations

- Program is **OPEN**
- Laboratory Approval Program for UCMR 5 is expected to be similar to the process used for all previous UCMR cycles
- Only the EPA-approved laboratories can analyze UCMR samples collected at PWSs
 - Approval is by method and by individual laboratory locations
 - A laboratory may apply for approval for any method(s)
- Laboratories need to meet:
 - UCMR 5 laboratory approval program criteria
 - Required equipment criteria
 - Laboratory performance criteria
 - Data reporting criteria (includes use of text file format to report to SDWARS)
- Labs must be approved by EPA to support UCMR 5 even if already certified or accredited by State/primacy entity for a particular method being used in UCMR 5

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Contracts for Small-System Sample Analysis

- EPA would need significantly more laboratory support than normal if UCMR 5 is finalized as proposed (based on the greater number of small water systems specified by America's Water Infrastructure Act of 2018 (AWIA))
- In preparation for UCMR 5 monitoring, EPA anticipates soliciting proposals and awarding contracts to laboratories to support small system sample analysis **prior to the end of the proficiency testing (PT) program**
- Historically, laboratories awarded contracts by EPA have been required to first be approved to perform all methods
- Interested laboratories are encouraged to start the Laboratory Approval Program process early

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Laboratory Approval General Procedure

- Step 1: Request to Participate
- Step 2: Registration
- Step 3: Application Package
- Step 4: EPA Review of Application Package
- Step 5: Proficiency Testing (PT)
- Step 6: Written EPA approval

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Step 1 – Request to Participate

- Interested laboratories submit a written request to the [UCMR Lab Approval@epa.gov](mailto:UCMR_Lab_Approval@epa.gov)
- EPA provides registration material
- EPA provides a custom application package based on registration information

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Step 2 – Registration

- Complete registration sheet typically includes:
 - List of the UCMR methods for which the laboratory sought approval
 - Laboratory information
 - Mailing and shipping address
 - Contact information
- Based on a January 1, 2023, anticipated start for UCMR 5 sample collection, EPA anticipates that the final opportunity for a laboratory to complete and submit the necessary registration and application information will be August 1, 2022

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Step 3 – Application Package

- Separate application for each method
- Application typically required to include:
 - Proof of current drinking water laboratory certification (for select compliance monitoring methods)
 - Personnel information
 - Quality Assurance (QA) information
 - Information regarding analytical equipment and sample handling procedures
 - Data submission for each method (e.g., Initial Demonstration of Capability (IDC) study, QC sample results, quantification reports)
- Lab would receive a copy of the Laboratory Approval Manual

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Change Between UCMR 4 and UCMR 5 Proposal: Laboratory Approval Registration and Application Deadlines

- Establish more flexible deadlines for laboratory approval

UCMR 4	UCMR 5 Proposed Change
To participate in the UCMR Laboratory Approval Program, the laboratory must complete and submit the necessary registration forms within 60 days of final rule publication , and necessary application materials within 120 days of final rule publication	Proposes that the laboratory complete and submit registration and application materials to EPA by August 1, 2022 to participate in the UCMR Laboratory Approval Program

- **Reason for change:** Provide greater flexibility per laboratory interest



Step 4 – Review of Application Package

- EPA reviews application package
 - If deficiencies are identified, EPA gives the lab an opportunity to make corrective actions and submit new application information
 - If all requested information is present and acceptable, EPA notifies the laboratory that they are eligible to participate in corresponding PT studies



Step 5 – Proficiency Testing (PT)

- EPA provides method-specific PT samples
- EPA anticipates offering up to three (3) PT studies prior to the publication of the final rule, and at least two (2) studies after publication of the final rule
- Plan to participate in PTs early if interested in becoming a contract laboratory for small system work
- As proposed, each laboratory would be required to:
 - Participate in at least two (2) PT studies for each method for which it seeks approval
 - Pass a PT for each analyte in each method for which the laboratory is seeking approval
 - Successfully report PT data to SDWARS using text file format

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Step 6 – Written EPA Approval

- After successful participation in a PT study for a specific method, EPA expects to send the laboratory a notification letter listing the methods for which approval is either:
 - Pending - pending promulgation of the final rule if the PT studies have been conducted prior to that time
 - Granted - after promulgation of the final rule
- Laboratories receiving pending approval are expected to be granted approval without further action following promulgation of the final rule if no changes have been made to the rule that impact the laboratory approval program
 - EPA expects to contact the laboratory if changes are made between the proposed and final rules that warrant additional action by the laboratory
- A list of approved laboratories and associated methods will be posted at: <https://www.epa.gov/dwucmr>

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Laboratory Approval Manual

- Procedures for obtaining UCMR approval and procedures for revocation of approval
- QA requirements
- QC requirements
 - MRL verification
 - Initial demonstration of capability
 - Initial calibration
 - Continuing calibration checks
 - Surrogate and internal standard criteria
 - Reagent blanks and fortified blanks
 - QC samples
 - Spiked field samples
 - Field blank criteria (if required by the method)
- Sample handling requirements

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Typical Criteria for Maintaining Approval

- Adhere to QA/QC measures in the methods, rule language, and the Laboratory Approval Manual
- Post occurrence data and required QC data via SDWARS within prescribed timeframe
- Respond to inquires or requests from Laboratory Approval Coordinator
- Participate in and pass on-site and/or paper audits

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Reporting Limit Background

- The minimum reporting level (MRL) is the minimum quantitation level that, with 95% confidence, can be achieved by capable analysts at 75% or more of the laboratories nationwide using a specified analytical method
- EPA establishes the MRL using data from multiple laboratories performing “Lowest Concentration Minimum Reporting Level” (LCMRL) studies to identify their capability
- Each single-laboratory lowest concentration MRL (LCMRL) is the lowest true concentration for which the future recovery is predicted to fall, with high confidence (99%), between 50 and 150% recovery
 - Lowest concentration that measurements of specified quality can be made by a particular laboratory
 - Simultaneous application of precision and accuracy

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MRLs

- Established to achieve quality and consistency across all UCMR laboratories, while allowing for appropriate national laboratory capacity
- MRLs are generally established as low as is feasible; typically lower than current HRLs and health advisories
- EPA will consider adjusting MRLs if there is confirmed and recurring evidence that an MRL is unattainable/impractical

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Proposed MRLs for UCMR 5

Analyte	CASRN	Analytical Method	MRL
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	763051-92-9	EPA 533	0.005 µg/L
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	EPA 533	0.005 µg/L
1H, 1H, 2H, 2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	EPA 533	0.003 µg/L
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	EPA 533	0.005 µg/L
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	EPA 533	0.003 µg/L
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	EPA 533	0.002 µg/L
hexafluoropropylene oxide dimer acid (HFPO-DA)(GenX)	13252-13-6	EPA 533	0.005 µg/L
nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	151772-58-6	EPA 533	0.02 µg/L

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Proposed MRLs for UCMR 5

Analyte	CASRN	Analytical Method	MRL
perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	113507-82-7	EPA 533	0.003 µg/L
perfluoro-3-methoxypropanoic acid (PFMPA)	377-73-1	EPA 533	0.004 µg/L
perfluoro-4-methoxybutanoic acid (PFMBA)	863090-89-5	EPA 533	0.003 µg/L
perfluorobutanesulfonic acid (PFBS)	375-73-5	EPA 533	0.003 µg/L
perfluorobutanoic acid (PFBA)	375-22-4	EPA 533	0.005 µg/L
perfluorodecanoic acid (PFDA)	335-76-2	EPA 533	0.003 µg/L
perfluorododecanoic acid (PFDoA)	307-55-1	EPA 533	0.003 µg/L
perfluoroheptanesulfonic acid (PFHpS)	375-92-8	EPA 533	0.003 µg/L

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Proposed MRLs for UCMR 5

Analyte	CASRN	Analytical Method	MRL
perfluoroheptanoic acid (PFHpA)	375-85-9	EPA 533	0.003 µg/L
perfluorohexanesulfonic acid (PFHxS)	355-46-4	EPA 533	0.003 µg/L
perfluorohexanoic acid (PFHxA)	307-24-4	EPA 533	0.003 µg/L
perfluorononanoic acid (PFNA)	375-95-1	EPA 533	0.004 µg/L
perfluorooctanesulfonic acid (PFOS)	1763-23-1	EPA 533	0.004 µg/L
perfluorooctanoic acid (PFOA)	335-67-1	EPA 533	0.004 µg/L
perfluoropentanesulfonic acid (PFPeS)	2706-91-4	EPA 533	0.004 µg/L
perfluoropentanoic acid (PFPeA)	2706-90-3	EPA 533	0.003 µg/L

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Proposed MRLs for UCMR 5

Analyte	CASRN	Analytical Method	MRL
perfluoroundecanoic acid (PFUnA)	2058-94-8	EPA 533	0.002 µg/L
n-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	2991-50-6	EPA 537.1	0.005 µg/L
n-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	2355-31-9	EPA 537.1	0.006 µg/L
perfluorotetradecanoic acid (PFTA)	376-06-7	EPA 537.1	0.008 µg/L
perfluorotridecanoic acid (PFTrDA)	72629-94-8	EPA 537.1	0.007 µg/L
Lithium	7439-93-2	EPA 200.7, SM 3120 B, ASTM D1976-20	9 µg/L

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Stakeholder Statements & Discussion

- Statements from Stakeholders that registered ahead of time
- Statements from Stakeholders that submit via the chat function of the webinar (subject to the availability of time)

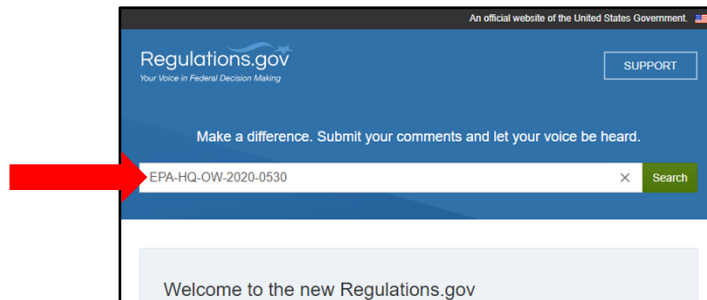


Process for Submitting Public Comments



Comments on the UCMR 5 Proposed Rule

- Go to <http://www.regulations.gov>
- Enter Docket ID EPA-HQ-OW-2020-0530
- Click **Search** button



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Comment Process/Accessing Docket

- The UCMR 5 docket should pop up on the next screen
- Click on the **Comment** button below the Proposed Rule



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Comment Process/Accessing Docket

- Enter comment and all required information on next screen
- Upload a document by clicking on the **Browse...** button
- Click on the **Submit Comment** button at the bottom of the page

Write a Comment
Read Agency Guidelines | Commenter's Checklist

Comment*

Start typing comment here... 5000

Attach Files

You can attach up to 20 files, but each file cannot exceed 10MB. Valid file types include: bmp, docx, gif, jpeg, pdf, png, pptx, rtf, shtml, tif, tiff, txt, wpd, xlsx, xml.

Drop files here or **Browse...**



Comment Process/Accessing Docket

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- Do not electronically submit any information you consider to be Confidential Business Information (CBI)
- Multimedia submissions (audio, video, etc.) must be accompanied by a written comment
 - Written comment is considered the official comment and should include discussion of all points you wish to make
- EPA public comment policy is at:
<http://www.epa.gov/dockets/commenting-epa-dockets>
- **Comments/questions/statements raised during this meeting are not registered as official public comments**



Closing Remarks

Thank you for participating in the UCMR 5 proposal discussion



If You Have Questions Following This Webinar

- **UCMR Homepage**
 - <https://www.epa.gov/dwucmr>
- **Contacts**
 - Brenda Bowden: bowden.brenda@epa.gov
 - Melissa Simic: simic.melissa@epa.gov
- **Lab Approval Program**
 - UCMR_Lab_Approval@epa.gov
- **UCMR Sampling Coordinator**
 - UCMR_Sampling_Coordinator@epa.gov
- **Safe Drinking Water Information**
 - <https://www.epa.gov/ground-water-and-drinking-water/safe-drinking-water-information>
- Meeting materials were sent to all registered participants
- If you did not receive a copy, please email UCMRwebinar@cadmusgroup.com and we will send you a copy



Abbreviations and Acronyms



Abbreviations and Acronyms

- **11Cl-PF3OUdS** – 11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid
- **4:2 FTS** – 1H, 1H, 2H, 2H-Perfluorohexane Sulfonic Acid
- **6:2 FTS** – 1H, 1H, 2H, 2H-Perfluorooctane Sulfonic Acid
- **8:2 FTS** – 1H, 1H, 2H, 2H-Perfluorodecane Sulfonic Acid
- **9Cl-PF3ONS** – 9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid
- **ADONA** – 4,8-Dioxa-3H-Perfluorononanoic Acid
- **ATSDR** – Agency for Toxic Substances and Disease Registry
- **AWIA** – America's Water Infrastructure Act of 2018
- **BCAN** – Bromochloroacetonitrile
- **CBI** – Confidential Business Information



Abbreviations and Acronyms

- **CCL** – Contaminant Candidate List
- **CDR** – Chemical Data Reporting
- **CDX** – Central Data Exchange
- **CFR** – Code of Federal Regulations
- **CWS** – Community Water System
- **DBAN** – Dibromoacetonitrile
- **DBP** – Disinfection Byproduct
- **DBP-ICR** – Disinfection Byproduct Information Collection Rule
- **DCAN** – Dichloroacetonitrile
- **EPA** – Environmental Protection Agency
- **EPTDS** – Entry Point to the Distribution System

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Abbreviations and Acronyms

- **FR** – Federal Register
- **GenX** – Trade Name for a Technology Used to Make High-Performance Fluoropolymers Without the Use of PFOA
- **GWRMPs** – Ground Water Representative Monitoring Plans
- **HA** – Office of Water Health Advisory
- **Health Canada** – Health Canada Guidelines for Canadian Drinking Water Quality
- **HESD** – Health Effects Support Document
- **HFPO-DA** – Hexafluoropropylene Oxide Dimer Acid
- **IARC** – International Agency for Research on Cancer

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Abbreviations and Acronyms

- **ICP-AES** – Inductively Coupled Plasma- Atomic Emission Spectrometry
- **IDC** – Initial Demonstration of Capability
- **IRIS** – Integrated Risk Information System
- **kg** – Kilograms
- **L** – Liter
- **LC/MS/MS** – Liquid Chromatography/Tandem Mass Spectrometry
- **LCMRL** – Lowest Concentration Minimum Reporting Level
- **LOAEL** – Lowest-Observed-Adverse-Effect Level
- **MAC** – Maximum Acceptable Concentration

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Abbreviations and Acronyms

- **MCLG** – Maximum Contaminant Level Goal
- **MDBP** – Microbial and Disinfection Byproduct
- **mg** – Milligrams
- **MMWR** – Center for Disease Control and Prevention's Morbidity and Mortality Weekly Reports
- **MRL** – Minimum Reporting Level
- **NAWQA** – National Water-Quality Assessment
- **NCOD** – National Contaminant Occurrence Database
- **NDAA** – National Defense Authorization Act
- **NEtFOSAA** – N-Ethyl Perfluorooctanesulfonamidoacetic Acid
- **NFDHA** – Nonfluoro-3,6-Dioxaheptanoic Acid

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Abbreviations and Acronyms

- **NIRS** – National Inorganics and Radionuclides Survey
- **NMeFOSAA** – N-Methyl Perfluorooctanesulfonamidoacetic Acid
- **NOAEL** – No-Observed-Adverse-Effect Level
- **NPDWRs** – National Primary Drinking Water Regulations
- **NTNCWS** – Non-Transient Non-Community Water System
- **OGWDW** – Office of Ground Water and Drinking Water
- **PBT** – Persistent, Bioaccumulative, and Toxic
- **PFAS** – Per- and Polyfluoroalkyl Substances
- **PFBA** – Perfluorobutanoic Acid
- **PFBS** – Perfluorobutanesulfonic Acid

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Abbreviations and Acronyms

- **PFDA** – Perfluorodecanoic Acid
- **PFDoA** – Perfluorododecanoic Acid
- **PFESA** – Perfluoro (2-Ethoxyethane) Sulfonic Acid
- **PFHpA** – Perfluoroheptanoic Acid
- **PFHpS** – Perfluoroheptanesulfonic Acid
- **PFHxA** – Perfluorohexanoic Acid
- **PFHxS** – Perfluorohexanesulfonic Acid
- **PFMBA** – Perfluoro-4-Methoxybutanoic Acid
- **PFMPA** – Perfluoro-3-Methoxypropanoic Acid
- **PFNA** – Perfluorononanoic Acid

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Abbreviations and Acronyms

- **PFOA** – Perfluorooctanoic Acid
- **PFOS** – Perfluorooctanesulfonic Acid
- **PFPeA** – Perfluoropentanoic Acid
- **PFPeS** – Perfluoropentanesulfonic Acid
- **PFTA** – Perfluorotetradecanoic Acid
- **PFTrDA** – Perfluorotridecanoic Acid
- **PFUnA** – Perfluoroundecanoic Acid
- **PPRTV** – Provisional Peer-Reviewed Toxicity Values
- **PT** – Proficiency Testing
- **PWS** – Public Water System

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Abbreviations and Acronyms

- **PWSID** – Public Water System Identification Code
- **QA** – Quality Assurance
- **QC** – Quality Control
- **RfD** – Reference Dose
- **SDWA** – Safe Drinking Water Act
- **SDWARS** – Safe Drinking Water Accession and Review System
- **SPE** – Solid Phase Extraction
- **TCAN** – Trichloroacetonitrile
- **TNCWS** – Transient Non-Community Water System
- **TOF** – Total Organic Fluorine

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Abbreviations and Acronyms

- **TSCA** – Toxic Substance Control Act
- **UCM** – Unregulated Contaminant Monitoring
- **UCMR** – Unregulated Contaminant Monitoring Rule
- **ug** – Micrograms
- **USGS** – United States Geological Survey
- **WHO** – World Health Organization