Synthetic Organic Chemical Monitoring, the Fifth Unregulated Contaminant Monitoring Rule, and Other Actions to Address Per- and Polyfluoroalkyl Substances (PFAS)

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Overview

- Refresher on synthetic organic chemical (SOC) monitoring
- Background on per- and polyfluoroalkyl substances (PFAS)
- EPA's PFAS Strategic Roadmap
- UCMR Program and the Proposed Fifth Unregulated Contaminant Monitoring Rule (UCMR5)
- Regulatory determination for PFOA/PFOS
- Toxicity assessments for PFBS and GenX chemicals

Synthetic Organic Chemicals (SOCs)

- Synthesized (man-made) from carbon and other elements like hydrogen, nitrogen, or chlorine; they do not occur naturally
- Sources: used as pesticides, herbicides, defoliants, and fuel additives and can enter water through runoff, industrial waste discharges, improper disposal of chemicals, and accidental releases

Regulated SOCs - 40 CFR 141.24, 141.61(c)

2,4,5-TP (Silvex)	Dibromochloro-propane	Hexachlorobenzene
2,4-D	Dinoseb	Hexachlorocyclo-pentadiene
Alachlor (Lasso)	Dioxin *(waived)*	Lindane
Atrazine	Diquat	Methoxychlor
Benzo(a)pyrene	Endothall	Oxamyl (Vydate)
Bis(2-ethylhexyl) Adipate	Endrin	Polychlorinated Biphenyls (PCBs)
Bis(2-ethylhexyl) Phthalate	Ethylene Dibromide	Pentachlorophenol
Carbofuran	Glyphosate	Picloram
Chlordane	Heptachlor	Simazine
Dalapon	Heptachlor Epoxide	Toxaphene

Region 8 requires sampling for 29 regulated SOCs.

SOC Monitoring

<u>Applicability</u>:

- Community water systems (CWS)
- Non-transient non-community water systems (NTNC)

<u>Monitoring Requirements</u> – Based on the **population served**.

- ≤ 3,300 persons - sample once every 3 years
- > 3,300 persons - sample twice in one year during each 3-year compliance period (in 2 different quarters)

Emerging Contaminants: What Are PFAS and Where Are They Found?

- Per- and poly-fluoroalkyl substances (PFAS) are manmade chemicals that have been in use since the 1940s.
- PFAS are used in firefighting foams, cookware, food packaging for grease-proofing, water repellant clothing, and in many other applications.
- Some health effects include increased risk of some cancers, decreased fertility, developmental effects, reduced ability of the body's immune system to fight infections, thyroid dysfunction, and other effects.

Chemical and Physical Properties of PFAS

- Carbon-fluorine bond is one of the strongest chemical bonds
- Chemically and thermally stable
- Extremely persistent in the environment with degradation periods of years, decades, or longer; some are known not to degrade
- Bioaccumulative
- Relatively low volatility
- Water soluble
- Surfactant-like

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Some Common PFAS Sources and Receptors

Sources

- Airports
- Military Installations/ Department of Defense Sites
- Fire Training Centers and some Fire Stations
- Industrial Sites
- Metal Plating Facilities
- Aircraft Crash Sites

"Intermediate Sources"

- Landfills
- Wastewater Treatment Plants (WWTPs)
- Farmland using biosolids tainted with PFAS (from WWTPs)

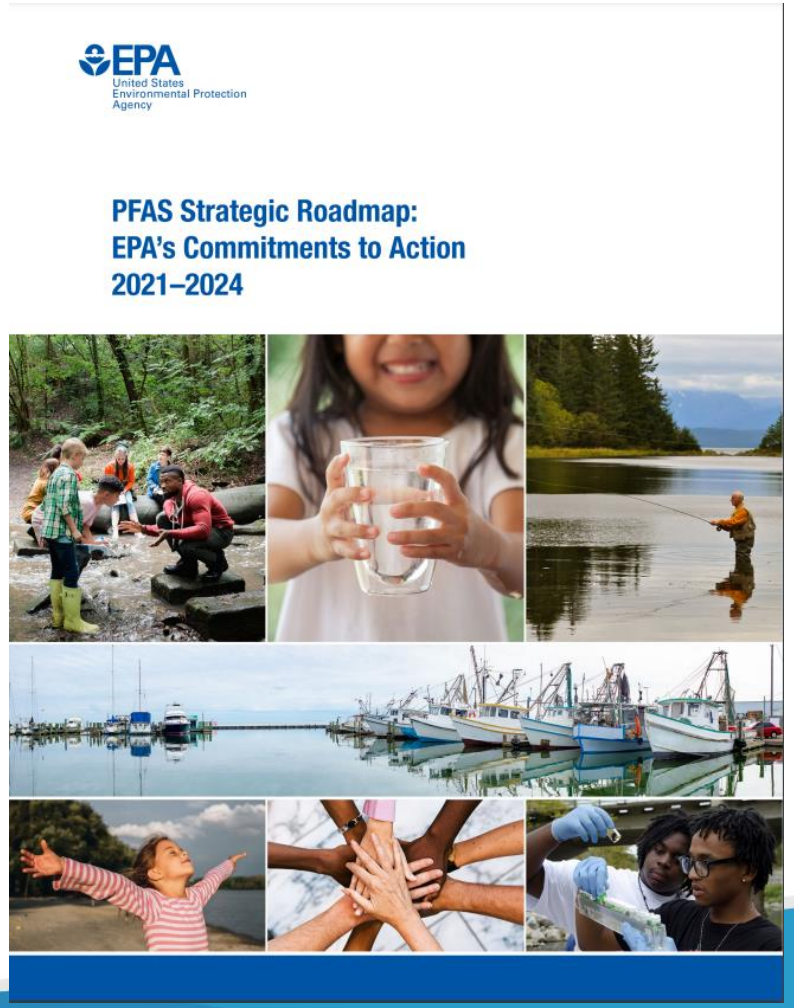
Receptors

- Groundwater
- Aquifers
- Surface Water
- Public Water Systems
- Humans and other species via consumption of contaminated water, produce, and livestock

EPA's PFAS Strategic Roadmap (2021-2024)

1. **Research** – Invest in research, development, and innovation to increase understanding of PFAS exposures and toxicities, human health and ecological effects, and effective interventions that incorporate the best available science.
2. **Restrict** – Pursue a comprehensive approach to proactively prevent PFAS from entering air, land, and water at levels that can adversely impact human health and the environment.
3. **Remediate** - Broaden and accelerate the cleanup of PFAS contamination to protect human health and ecological systems.

www.epa.gov/pfas



What is the Unregulated Contaminant Monitoring Rule (UCMR)?

- Collects data for contaminants suspected to be present in drinking water but do not yet have health-based standards
- 1996 Safe Drinking Water Act amendments require that once every 5 years the EPA issue a list of no more than 30 unregulated contaminants be monitored for by public water systems [SDWA section 1445(a)(2)]
- Requires public water systems (PWS) serving population >10,000 people, as well as a nationally representative sample of PWS serving ≤10,000 people, to monitor
- Store results in a national contaminant occurrence database
- Provide notification to customers

What is the Purpose of the UCMR Program?

- Collect nationally representative occurrence data for unregulated contaminants
- Provides results about contaminants that are known or anticipated to occur at public water systems and the levels of exposure
- Provides information on the population exposed
- Data considered as part of future EPA decisions to protect public health through regulation under the SDWA
- Provide data to States, Tribes, and local governments, and to the public for their use in decisions regarding public health protection.

Fifth Unregulated Contaminant Monitoring Rule (UCMR5)

- UCMR5 final rule published on December 27, 2021
- Proposes monitoring for 29 per- and polyfluoroalkyl substances (PFAS) and lithium
- Community water systems and non-transient non-community water systems would monitor at the entry point to the distribution system
- Monitoring will occur 2023 to 2025

https://www.epa.gov/dwucmr/fifth-unregulated-contaminant-monitoring-rule

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 UCMR5 for which a drinking water method has been validated by the Administrator and that are not subject to a NPDWR

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-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	Perfluoroundecanoic acid (PFUnA)
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	*PFAS monitored under UCMR 3 are in **bold***
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	

What is the Monitoring Design for UCMR5?

- Monitoring will be at the entry point to the distribution system
  - Surface water (including those using groundwater under the direct influence of surface water) systems: sample 4 consecutive quarters (3 months apart) during their year of monitoring
  - Groundwater systems: sample twice over the course of a year, with each sample event 5 to 7 months apart
- EPA pays for the sampling and analytical costs for small systems, while large systems are responsible for their own costs
- National Contaminant Occurrence Database – published data

Timeline for UCMR5 Activities

2022	2023	2024	2025	2026
Pre-sampling Activity by EPA • Manage Lab Approval Program • Finalize State Monitoring Plans • Begin PWS **SDWARS** registration/ inventory review • Review GWRMP submittals • Conduct outreach/trainings	**Sampling Period** **EPA Implementation Activities** • Provide compliance assistance • Implement small system monitoring • Post data quarterly to NCOD **PWS Sample Collection; Laboratory Analysis; Reporting** • All large systems serving more than 10,000 people; • All small systems serving between 3,300 and 10,000 people; • 800 small systems serving fewer than 3,300 people			**Post-sampling Activity** **PWSs, Laboratories** • Complete resampling, as needed • Conclude data reporting **EPA** • Complete upload of UCMR5 data to NCOD

America's Water Infrastructure Act (AWIA) of 2018

- SDWA was amended in 2018 by Public Law 115-270
  - AWIA section 2021, enacted October 23, 2018
- Key changes to UCMR5 (SDWA section 1445(j)):
  - Require public water systems (PWS) serving between 3,300 and 10,000 to monitor
  - Ensure that only a representative sample of PWS serving < 3,300 people monitor
- Limitations:
  - **Subject to the availability of appropriations and sufficient laboratory capacity to accommodate the analyses**
- Authorizes, but does not appropriate $15,000,000 per fiscal year
- Under AWIA provisions, EPA continues to be responsible for all analytical costs associated with monitoring at systems serving ≤ 10,000 people

Public Water Systems Subject to UCMR5

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[2] and NTNCWSs)	800
Medium 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

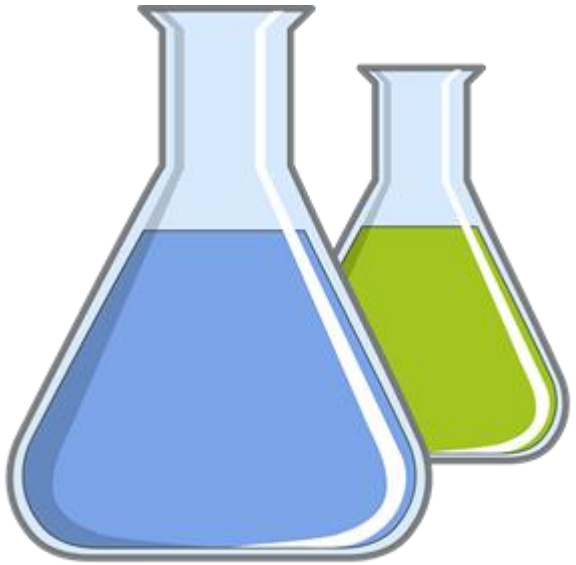
[2] CWS = community water system; NTNCWS = non-transient non-community water system

What about Laboratories for UCMR5?

- Only EPA approved laboratories can be utilized for analytical services for UCMR monitoring

- EPA administers a laboratory approval program

EPA's list of approved laboratories: https://www.epa.gov/dwucmr/fifth-unregulated-contaminant-monitoring-rule



UCMR5 Resources

- Homepage for Monitoring the Occurrence of Unregulated Drinking Water Contaminants: www.epa.gov/dwucmr.
- Fifth UCMR: www.epa.gov/dwucmr/fifth-unregulated-contaminant-monitoring-rule
  - Contaminants and minimum reporting levels
  - Final rule
  - UCMR5 fact sheet
  - Public stakeholder meetings (webinars)
  - Approved laboratories list
  - Future posts: occurrence data

Third UCMR (UCMR3)

- UCMR3 collected nationwide occurrence data on 6 PFAS between 2013 and 2015.
- In addition to PFOA and PFOS, UCMR3 included PFNA, PFHxS, PFHpA, and PFBS.
- Data collected under UCMR3 found:
  - 1.3% of public water systems had at least one sample with concentrations greater than EPA's health advisory of 70 ppt (0.07 ug/L) for PFOA and/or PFOS.
  - 4% of public water systems reported measurements of one or more of the 6 PFAS

✓In Wyoming samples were collected from public water systems supplying Casper, Cheyenne, Evanston, Gillette, Green River, Hanna, Laramie, Riverton, Rock Springs, Sheridan, and Wright. All results were below detection levels.

Regulatory Determination for PFOA and PFOS

- On March 3rd, 2021, the Agency published a final determination to regulate perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) in drinking water.
- Per SDWA, the Administrator shall propose a maximum contaminant level goal (MCLG) and propose a rule no later than 24 months after the determination, and promulgate a final regulation within 18 months of the proposal.
- Commitments: proposed rule Fall 2022, final rule Fall 2023

Health Advisory for PFOA and PFOS

- EPA established a health advisory level of 70 ppt in 2016 to provide Americans, including the most sensitive populations, with a margin of protection from a lifetime of exposure to PFOA and PFOS from drinking water.

Toxicity Assessment for PFBS

- Last April the agency issued an updated toxicity assessment for perfluorobutanesulfonic acid (PFBS). The updated PFBS assessment reflects the best available science, involved extensive federal, state, and public engagement, and is critical to EPA efforts to help communities impacted by PFAS. https://www.epa.gov/pfas/learn-about-human-health-toxicity-assessment-pfbs
  - Key step toward developing a national drinking water Health Advisory for PFBS targeted for Spring 2022
- PFBS is a 4-carbon PFAS that was developed as a replacement for PFOS, a chemical that was voluntarily phased out by the primary U.S. manufacturer by 2002.

Toxicity Assessment for GenX (HFPO-DA)

- Last October EPA released the final toxicity assessment for GenX chemicals (hexafluoropropylene oxide (HFPO) dimer acid and its ammonium salt) https://www.epa.gov/pfas/genx-toxicity-assessments-documents
  - Key step toward developing a national drinking water Health Advisory for GenX chemicals targeted for Spring 2022
- EPA developed the toxicity assessment for PFBS in April, and is developing peer-reviewed toxicity assessments for PFBA, PFHxA, PFHxS, PFNA, and PFDA to support stakeholders.

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