PFAS National Primary Drinking Water Regulation

Spring WARWS Operator Training Conference
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United States Environmental Protection Agency

PFAS Background

- 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, water repellant clothing, and in many other applications.
  - PFAS tend to break down extremely slowly in the environment, and can build up in people, animals, and the environment over time.
  - Although some specific PFAS have been largely phased out due to health and environmental concerns, they may still be found in the environment and in drinking water.

PFAS Background

- We now know that over a long time PFAS may:
  - Lead to negative health effects on pregnant people and in developing babies
  - Weaken a body's ability to fight infections and disease
  - Increase the risk for some cancers (prostate, kidney, testicular) and damage the liver
  - Disrupt thyroid function (metabolism regulation)
  - Elevate cholesterol levels (which can increase the risk for heart attack or stroke)

PFAS Background

- Different PFAS are often found together and in combinations (or mixtures) in drinking water and the environment.
- Drinking water is a direct way people can be exposed to PFAS.
- By regulating PFAS in drinking water, EPA is acting to protect people and reduce our exposure, which can lower our risk for these health effects.
- When implemented, the rule will prevent thousands of deaths and reduce tens of thousands of serious PFAS-attributable illnesses.

PFAS National Primary Drinking Water Regulation

Applicability: Community Water Systems and Non-Transient Non-Community Water Systems

Standards:

1. Establishes legally enforceable Maximum Contaminant Levels (MCLs) for 6 PFAS in drinking water: PFOA, PFOS, PFHxS, PFNA, PFBS, and HFPO-DA (GenX Chemicals)
2. Establishes non-enforceable Maximum Contaminant Level Goals (MCLGs) for these 6 PFAS.
    - MCLGs are the maximum level of a contaminant in drinking water where there are no known or anticipated negative health effects.

Regulatory Levels: Summary

Chemical	Maximum Contaminant Level Goal (MCLG)	Maximum Contaminant Level (MCL)
PFOA	0	4.0 ppt
PFOS	0	4.0 ppt
PFHxS	10 ppt	10 ppt
PFNA	10 ppt	10 ppt
HFPO-DA (GenX chemicals)	10 ppt	10 ppt
Mixtures of two or more: PFHxS, PFNA, HFPO-DA, and PFBS	Hazard Index of 1 (unitless)	Hazard Index of 1 (unitless)

*Compliance is determined by running annual averages at the sampling point.

Regulatory Levels: Hazard Index

- The Hazard Index is used to determine the health concerns associated with exposure to chemical mixtures.
- It is calculated by adding the ratio of the water sample concentration to a health-based water concentration (HBWC).

$$HI\ MCL = \left(\frac{[HFPO{-}DA_{water}]}{[10\ ppt]}\right) + \left(\frac{[PFBS_{water}]}{[2000\ ppt]}\right) + \left(\frac{[PFNA_{water}]}{[10\ ppt]}\right) + \left(\frac{[PFHxS_{water}]}{[10\ ppt]}\right) = 1$$

Hazard Index MCL Calculation Examples

Example 1: Water System A – Exceedance of proposed Hazard Index MCL

GenX Chemicals PFBS PFNA PFHxS Hazard Index

$$\left(\frac{[5\ \text{ppt}]}{[10\ \text{ppt}]}\right) + \left(\frac{[200\ \text{ppt}]}{[2000\ \text{ppt}]}\right) + \left(\frac{[5\ \text{ppt}]}{[10\ \text{ppt}]}\right) + \left(\frac{[9\ \text{ppt}]}{[10.0\ \text{ppt}]}\right) = \mathbf{2}$$

Example 2: Water System B – Meets proposed Hazard Index MCL

GenX Chemicals PFBS PFNA PFHxS Hazard Index

$$\left(\frac{[0\ \text{ppt}]}{[10\ \text{ppt}]}\right) + \left(\frac{[100\ \text{ppt}]}{[2000\ \text{ppt}]}\right) + \left(\frac{[3\ \text{ppt}]}{[10\ \text{ppt}]}\right) + \left(\frac{[1\ \text{ppt}]}{[10.0\ \text{ppt}]}\right) = \mathbf{0.5}$$

Compound	HBWC
PFHxS	10 ppt
PFNA	10 ppt
PFBS	2,000 ppt
HFPO-DA (GenX Chemicals)	10 ppt

Hazard Index standard = 1 (unitless)

Implementation Features

- Conduct initial monitoring and ongoing compliance monitoring
- Implement solutions to reduce regulated PFAS in drinking water if levels exceed the MCLs
- Inform the public of the measured levels of PFAS in drinking water if an MCL is exceeded

Implementation: Timeframes

WITHIN 3 YEARS
(By 2027)

- Initial monitoring must be completed (2024 – 2027)

AT 3 YEARS
(Starting 2027)

- Routine monitoring for compliance must begin
- Results included in consumer confidence reports (CCRs)
- Public notification begins for monitoring and reporting violations

AT 5 YEARS
(Starting 2029)

- Comply with all MCLs
- Public notification for MCL violations (starting 2029)

Initial Monitoring

Sample Location: all entry points to the distribution system

Surface Water Systems
serving all population sizes

- Quarterly within 12-month period
- Samples collected 2 to 4 months apart.

Groundwater Systems
serving > 10,000 customers

- Quarterly within 12-month period
- Samples collected 2 to 4 months apart.

Groundwater Systems
serving ≤ 10,000 customers

- Twice within 12-month period
- Samples collected 5 to 7 months apart.

Cost Reduction: previously acquired data may be used to satisfy some or all initial monitoring requirements

Monitoring Frequency and Trigger Levels

- Trigger level = one-half the MCLs and one-half the Hazard Index (i.e. 2.0 ppt for PFOA and PFOS, or 0.5 Hazard Index for mixtures)
- Based on initial monitoring, systems with samples greater than or equal to the trigger levels must conduct quarterly monitoring for all regulated PFAS
- Based on initial monitoring, systems that have all sample results below the trigger levels for all regulated PFAS can reduce monitoring to once every 3 years

Compliance

Compliance with the MCLs and Hazard Index is determined by calculating the running annual average (RAA) of your sample results

Chemical	Quarter 1		Quarter 2		Quarter 3		Quarter 4	
	Sample	Q1 Formula	Sample	Q2 Formula	Sample	Q3 Formula	Sample	Q4 Formula
HFPO-DA (ppt)	5 ppt	5 ppt/10 ppt = 0.5	5 ppt	5 ppt/10 ppt = 0.5	Not detected	0 ppt/10 ppt = 0	Not detected	0 ppt/10 ppt = 0
PFBS (ppt)	5 ppt	5 ppt/2000 ppt = 0.0025	5 ppt	5 ppt/2000 ppt = 0.0025	Not detected	0 ppt/2000 ppt= 0	5 ppt	5 ppt/2000 ppt = 0.0025
PFNA (ppt)	Not detected	0 ppt/10 ppt = 0	Not detected	0 ppt/10 ppt = 0	4 ppt	4 ppt /10 ppt = 0.4	Not detected	0 ppt/10 ppt = 0
PFHxS (ppt)	3 ppt	3 ppt/10 ppt = 0.3	Not detected	0 ppt/10 ppt = 0	4 ppt	4 ppt /10 ppt = 0.4	6 ppt	6 ppt/10 ppt = 0.6
Hazard Index (unitless)	0.5 + 0.0025 + 0 + 0.3 = 0.8025		0.5 + 0.0025 + 0 + 0 = 0.5025		0 + 0 + 0.4 + 0.4 = 0.8		0 + 0.0025 + 0 + 0.6 = 0.6025	

Running Annual Average = $\left(\frac{0.8025 + 0.5025 + 0.8 + 0.6025}{4}\right)$ = 0.6769 = 0.7

The Hazard Index Running Annual Average result is 0.7 (rounded to one significant digit). Because this result does not exceed 1, the water system has not exceeded the MCL. Therefore, no violation of the Hazard Index MCL has occurred.

Compliance

- Use “0” for a quarterly sample result if it is less than the practical quantitation limit (PQL), to calculate the RAA.
- If RAA > MCL for any regulated PFAS, the system is in **violation** of the MCL and must continue quarterly monitoring for all regulated PFAS.
- If RAA ≤ MCLs for all regulated PFAS, the system is **compliant** with the standards.

Triennial Monitoring

- Sampling once every 3 years is the routine frequency for compliance monitoring.
- Based on initial monitoring, systems with sample results less than the trigger levels for all regulated PFAS are eligible for triennial monitoring.
- Triennial monitoring at a sampling location continues if all results are below all trigger levels.
- If there is a sample result for any regulated PFAS ≥ the trigger levels, quarterly monitoring is required.

Annual Monitoring

- After 4 consecutive quarterly sample results below the MCLs, a determination that the entry point is reliably and consistently below the MCLs can be made to reduce monitoring to once a year.
- Annual monitoring continues as long as the samples are below the MCLs; if a result for any regulated PFAS equals or exceeds the MCLs, the system must return to quarterly monitoring.
- After 3 consecutive annual samples below the trigger levels for all regulated PFAS, monitoring can be further reduced to once every 3 years.

Public Notice (PN)

- MCL violations can be assessed in 5 years and will require public notice as soon as practicable but no later than 30 days
  - The PN would alert consumers of the violation and if there is a risk to public health.
- Monitoring and reporting violations can be assessed in 3 years and will require public notice within one year.
- Community water systems are required to report measurable levels of the 6 PFAS and the hazard index for mixtures in the annual CCR.

Use of Previously Acquired Data to Satisfy Initial Monitoring Requirements

- Conditions:
  - Samples collected in accordance with the Fifth Unregulated Contaminant Monitoring Rule (UCMR5), collected on or after January 1, 2023 [40 CFR 141.40].
  - Samples collected on or after January 1, 2019; most recent data from multiple years of data must be used.
  - Samples analyzed with EPA Methods 537.1 or 533
  - Acceptable data may be reported to a concentration no greater than the MCLs
- Sampling will be required where fewer samples are available than the number required for initial monitoring.

Methods and Laboratories

- EPA Methods 537.1 or 533 must be used to analyze samples
- Labs must be certified by EPA or the State

Best Available Treatment (BAT) Technologies for PFAS Removal

- Granular Activated Carbon (GAC)
- Anion Exchange
- Reverse Osmosis/Nanofiltration

Implementation

- EPA Region 8 guided
- Additional outreach and trainings
- Ongoing compliance assistance

Resources

PFAS Rule Homepage:

Fact sheets, FAQs, the pre-publication Federal Register Notice, and a general presentation.

https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas.

Webinars:

- April 23, 2024 (12:00 - 1:00 pm MDT): Drinking Water Utilities and Professionals Technical Overview of PFAS NPDWR
- April 30, 2024 (12:00 - 1:30 pm MDT): Small Drinking Water Systems Webinar Series on Final PFAS NPDWR and PFAS Drinking Water Treatment

Funding Opportunities

The Bipartisan Infrastructure Law (BIL) provides $9 billion to invest in communities impacted by PFAS and other emerging contaminants in drinking water: www.epa.gov/infrastructure.

$4 billion	**Drinking Water State Revolving Fund**
$5 billion	**Small or Disadvantaged Communities Drinking-Water Grants**

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Technical Assistance Opportunities

- **WaterTA** supports communities to identify water challenges, develop plans, improve resiliency, build technical, managerial and financial capacity, and develop application materials to access water infrastructure funding: https://www.epa.gov/water-infrastructure/water-technical-assistance-waterta
- All programs offering technical assistance: https://www.epa.gov/water-infrastructure/water-technical-assistance-programs

To learn more about the final rule visit: https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas

Questions?
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