PROPOSED RULEMAKING

ENVIRONMENTAL QUALITY BOARD

[25 PA. CODE CH. 109]

Safe Drinking Water PFAS MCL Rule

The Environmental Quality Board (Board) proposes to amend Chapter 109 (relating to safe drinking water) to read as set forth in Annex A. The proposed amendments will improve public health protection by setting maximum contaminant level goals (MCLG) and maximum contaminant levels (MCL) for two per- and polyfluoroalkyl substances (PFAS)—perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS).

PFAS are considered emerging contaminants because research is ongoing to better understand the potential impacts PFAS pose to human and animal health and the environment. PFAS are potentially linked to a number of adverse health effects, including high cholesterol, developmental effects including low birth weight, liver toxicity, decreased immune response, thyroid disease, kidney disease, ulcerative colitis and certain cancers, including testicular cancer and kidney cancer.

The proposed amendments are intended to protect public health by setting State MCLs for contaminants in drinking water that are currently unregulated at the Federal level. With the proposed amendments, the Commonwealth would move ahead of the United States (U.S.) Environmental Protection Agency (EPA) in addressing PFOA and PFOS in drinking water and join a small group of states that have set MCLs for select PFAS in drinking water. Currently, six states have set MCLs for one or more PFAS—Massachusetts, Michigan, New Hampshire, New Jersey, New York and Vermont.

Safe drinking water is vital to maintaining healthy and sustainable communities. Proactively addressing PFOA and PFOS contamination in drinking water can reduce the incidence of illness and reduce health care costs. Recent research suggests that the EPA's Combined Lifetime Health Advisory Level (HAL) for PFOA and PFOS is not sufficiently protective against adverse health effects. The EPA has started the process of setting more stringent standards for PFOA and PFOS in drinking water, but that process is expected to take years to complete. For that reason, it is important that the Board act now to propose more protective standards for this Commonwealth, to protect the health of residents in this Commonwealth. Proper investment in public water system infrastructure and operations helps ensure a continuous supply of safe drinking water, enables communities to plan and build future capacity for economic growth, and ensures their long-term sustainability for years to come.

The proposed PFOA and PFOS MCLs will apply to all 3,117 community, nontransient noncommunity, bottled, vended, retail and bulk water systems in this Commonwealth. Of these, 1,905 are community water systems, serving a combined population of approximately 11.4 million residents in this Commonwealth. Another 1,096 are nontransient noncommunity water systems serving approximately 507,000 persons.

The proposed amendments also include minor revisions to address incorrect cross-references and citations, delete duplicated text and update language to be consistent with revisions made in the 2018 General Update of the Chapter 109 regulations. These minor updates are a codification of existing practices and will have no change from current practice.

This proposed rulemaking was adopted by the Board at its meeting of November 16, 2021.

A. *Effective Date*

This proposed rulemaking will go into effect upon final-form publication in the *Pennsylvania Bulletin*. Initial compliance monitoring for community and nontransient noncommunity water systems serving a population of greater than 350 persons and all bottled, vended, retail and bulk systems begins January 1, 2024; initial monitoring for community and nontransient noncommunity water systems serving a population of less than or equal to 350 persons begins January 1, 2025.

B. *Contact Persons*

For further information, contact Lisa D. Daniels, Director, Bureau of Safe Drinking Water, P.O. Box 8467, Rachel Carson State Office Building, Harrisburg, PA 17105-8467, (717) 787-9633; or Leda J. Lacomba, Assistant Counsel, Bureau of Regulatory Counsel, P.O. Box 8464, Rachel Carson State Office Building, Harrisburg, PA 17105-8464, (717) 787-7060. Information regarding submitting comments on this proposed rulemaking appears in section I of this preamble. Persons with a disability may use the Pennsylvania Hamilton Relay Service at (800) 654-5984 (TDD users) or (800) 654-5988 (voice users). This proposed rulemaking is available electronically through the Department of Environmental Protection's (Department) web site at www.dep.pa.gov (select "Public Participation," then "Environmental Quality Board," and then navigate to the Board meeting of November 16, 2021).

C. *Statutory Authority*

This proposed rulemaking is being made under the authority of section 4 of the Pennsylvania Safe Drinking Water Act (act) (35 P.S. § 721.4), which grants the Board the authority to adopt rules and regulations governing the provision of drinking water to the public, and section 1920-A of The Administrative Code of 1929 (71 P.S. § 510-20), which authorizes the Board to promulgate rules and regulations necessary for the performance of the work of the Department.

D. *Background and Purpose*

PFAS are a large class of man-made synthetic chemicals that were created in the 1930s and 1940s for use in many industrial and manufacturing applications. It is estimated that the PFAS family includes more than 6,000 chemical compounds. PFAS have been widely used for their unique properties that make products repel water, grease and stains, reduce friction and resist heat. PFAS are found in industrial and consumer products such as clothing, carpeting, upholstery, food packaging, non-stick cookware, fire-fighting foams, personal care products, paints, adhesives, metal plating, wire manufacturing and many other uses. Because of their unique chemical structure, PFAS readily dissolve in water and are mobile, are highly persistent in the environment and bioaccumulate in living organisms over time.

Decades of widespread use of products containing PFAS has resulted in elevated levels of environmental pollution and exposure in some areas of the State. PFAS remain in the environment and cycle through various media (air, water, soil) depending on how and where the substances

were released. The primary means of distribution of PFAS throughout the environment has been though the air, water, biosolids, food, landfill leachate and fire-fighting activities. For a diagram showing the PFAS cycle and its exposure pathways, refer to the Department's PFAS webpage at www.dep.pa.gov/Citizens/My-Water/drinking_water/PFAS/Pages/DEP-Involvement.aspx.

The Department's Safe Drinking Water Program first became aware of PFAS as emerging contaminants in 2013 when the EPA included six PFAS in its Third Unregulated Contaminant Monitoring Rule (UCMR3). The six PFAS included in UCMR3 monitoring are PFOA, PFOS, perfluorononanoic acid (PFNA), perfluorohexanesulfonic acid (PFHxS), perfluoroheptanoic acid (PFHpA), and perfluorobutanesulfonic acid (PFBS). The UCMR rules are Federal direct-implementation rules that are updated every 5 years to require monitoring for up to 30 unregulated contaminants to generate National occurrence data and inform the Federal regulatory determination process. Public water systems (PWS) serving more than 10,000 people and a select number of smaller PWSs were required to monitor for PFAS and other contaminants during 2013—2015 for UCMR3. In this Commonwealth, a total of 175 systems conducted PFAS monitoring for UCMR3; of these systems, PFAS was detected at 6 systems above the 2009 Provisional Health Advisory Levels (HAL) for PFOA and PFOS of 400 nanograms per liter (ng/L) or parts per trillion (ppt) and 200 ng/L, respectively. The Department worked closely with the EPA and the PWSs to address the elevated levels of PFAS found during the UCMR3 monitoring.

In May of 2016, the EPA issued the Final HAL for PFOA and PFOS as a Combined Lifetime HAL of 70 ng/L. At that time, the Department began implementing the EPA's Combined Lifetime HAL of 70 ng/L for PFOA and PFOS using existing authority under the act and Chapter 109 regulations. PWSs that exceed the HAL are required to conduct follow-up and corrective actions to protect public health, including the following actions:

- One-hour reporting of sample results to the Department to ensure timely consultation and oversight regarding investigative and corrective actions (§ 109.701(a)(3)(iii) (relating to reporting and recordkeeping)),
- Collection of confirmation samples (§ 109.302 (relating to special monitoring requirements)),
- Issuance of Tier 2 Public Notice to consumers (§ 109.409 (relating to Tier 2 public notice—categories, timing and delivery of notice)),
- Quarterly monitoring at the entry point to track levels of contamination (§ 109.302), and
- If levels continue to exceed the HAL, taking additional actions as needed to protect public health such as taking contaminated sources off-line or installing treatment (§ 109.4 (relating to general requirements)).

PFAS action team

In the absence of Federal action to address PFAS, Governor Tom Wolf signed Executive Order 2018-08 (EO) on September 19, 2018. The EO created the PFAS Action Team, a multi-agency group tasked with, among other things, developing a comprehensive response to identify and eliminate sources of contamination, ensure drinking water is safe, manage environmental contamination, review gaps in data and oversight authority, and recommend actions to address those gaps. The PFAS Action Team released its Initial Report in December of 2019 to the Department's PFAS webpage at www.dep.pa.gov/pfas. The report includes information about PFAS, challenges associated with managing contamination, actions taken to date and recommendations for future actions. Recommendations include additional funding for communities dealing with PFAS contamination and strengthened statutory authorities to adequately address PFAS.

In 2019, the Department's Safe Drinking Water Program moved forward with two key projects to advance its knowledge of PFAS—the PFAS Sampling Plan and PFAS Toxicology Services Contract.

PFAS Sampling Plan

The PFAS Sampling Plan was developed and posted to the Department's PFAS webpage at www.dep.pa.gov/Citizens/My-Water/drinking_water/PFAS/Pages/DEP-Involvement.aspx in April of 2019. The plan was intended to prioritize PWS sites for PFAS sampling and generate Statewide occurrence data. Several factors were considered in developing the targeted plan, including:

- Identification of "potential sources of PFAS contamination" (PSOC) based on a literature review,
- Identification of PWS sources located within 1/2 to 3/4 of a mile from PSOCs, and
- Selection of PWS sources to serve as a control or baseline group.

The selection process involved a combination of spatial analysis and programmatic review. The spatial analysis included the creation of a Geographic Information System (GIS) project using ArcMap 10.4.1 that focused on PWS source locations and information about PSOCs. The sampling pool was prioritized based on relative risk and included community water systems and nontransient noncommunity water systems.

To prioritize sampling, the selection process included an assessment of the potential risk from nearby PSOCs. Several layers containing locational and other information specific to PSOCs were created or otherwise included in the GIS. These layers include the following industries and land uses:

- Military bases
- Fire training schools/sites
- Airports
- Landfills
- Manufacturing facilities (apparel, chemicals, electronics, fabricated metal, paper products, textiles and leather, upholstered furniture)
- State Hazardous Sites Cleanup Act sites, the EPA Superfund sites and other known PFAS-contamination sites

The sampling plan includes details about the sources of GIS data and multiple maps that indicate the locations and prevalence of the PSOCs and the locations of the targeted and baseline sampling sites.

Based on the compilation of PSOCs, the information was used to select PWS sources that are located within 1/2 to 3/4 of a mile of a PSOC. The initial sampling pool included 493 PWS sources. The sampling pool contained a mix of PWS types and sizes and provided a good spatial distribution across the State. Based on available funding of $500,000, the Department proposed sampling at 360 targeted and 40 baseline entry point (EP) sites. Baseline sources are located in a HUC-12 watershed (a watershed assigned a 12-digit hydrologic unit code, or HUC, by the United States Geological Survey) with at least 75%

forested land and at least 5 miles from a PSOC. Ultimately, samples were collected from 412 EPs including 372 targeted sites and 40 baseline sites. Note that an EP to the distribution system may include water from more than one source of supply.

Sampling and analysis began during the Summer of 2019 using EPA Method 537 and a PA-accredited lab to analyze samples for the six UCMR3 PFAS. However, in early 2020, the Department took the opportunity to modify its analysis of samples by switching to EPA Method 537.1, which expanded the collection of occurrence data to 18 PFAS and adding the Department's Bureau of Laboratories for analysis. For consistency purposes, the Department repeated the sampling and analysis that had been conducted in 2019. Sampling was temporarily suspended from March 2020 to July 2020 due to the novel coronavirus (COVID-19) pandemic and resulting business closures and travel restrictions established under the Governor's Emergency Declaration. Sampling resumed in August 2020 and was completed at the end of March 2021, with the final sample results posted to the Department's PFAS webpage in June 2021. Table 1 includes a summary of the results from the PFAS Sampling Plan for the same six PFAS that were sampled under UCMR3.

Table 1. Summary of PFAS Sampling Plan results. Full results available at www.dep.pa.gov/pfas

Summary of PFAS Sampling Plan Results							
	PFOA	*PFOS*	*PFNA*	*PFHxS*	*PFHpA*	*PFBS*	*Units*
Total No. Samples	412	412	412	412	412	412	—
Average	2.0	2.5	0.4	1.4	0.7	1.1	ng/L
Median	0 (ND)	0 (ND)	0 (ND)	0 (ND)	0 (ND)	0 (ND)	ng/L
Minimum	0 (ND)	0 (ND)	0 (ND)	0 (ND)	0 (ND)	0 (ND)	ng/L
Maximum	59.6	187.1	18.1	140.0	32.6	64.0	ng/L
No. and % of Detects	112 (27%)	103 (25%)	23 (6%)	52 (13%)	49 (12%)	66 (16%)	—
Avg Detect Value	7.5	9.9	7.2	10.9	6.1	7.0	ng/L
Med Detect Value	5.3	6.5	5.6	4.5	4.5	4.2	ng/L
Min Detect Value	1.7	1.8	1.8	1.9	1.8	1.7	ng/L
Max Detect Value	59.6	187.1	18.1	140.0	32.6	64.0	ng/L

For example, of the 412 samples analyzed for PFOA, 112 (27%) resulted in detectable concentrations of PFOA. The remaining 300 samples resulted in no detectable concentrations of PFOA. For the 112 samples in which PFOA was detected, the average detected value was 7.5 ng/L, the median detected value was 5.3 ng/L, the minimum detected value was 1.7 ng/L, and the maximum detected value was 59.6 ng/L.

At the sampling sites with detections, 8 of the 18 PFAS included in EPA Method 537.1 were detected. The eight PFAS that were detected are: PFOA, PFOS, PFNA, PFHxS, PFHpA, PFBS, perfluorohexanoic acid and perfluoroundecanoic acid. Of the PFAS detected, PFOA and PFOS were most common, detected at 112 (or 27%) and 103 (or 25%) sites, respectively. Of the 412 total samples, 2 of the results were above the EPA's HAL of 70 ng/L for the combined concentrations of PFOA and PFOS. Results were nondetect at all 412 sites for the other 10 PFAS that were tested.

Additionally, there are 23 results with detections from UCMR3 monitoring that were also included in the occurrence data evaluation. Because the reporting limits used for UCMR3 monitoring (40 ng/L for PFOA and 20 ng/L for PFOS) were much higher than current reporting limits (which are generally below 5 ng/L), the Department did not include UCMR3 data that was below the UCMR3 reporting limits.

Therefore, the Department used results from a total of 435 sampling sites in the evaluation of occurrence data.

PFAS Toxicology Services Contract

In December 2019, the Department's Safe Drinking Water Program executed a toxicology services contract with Drexel University to: review other state and Federal agency work on MCLs; independently review the data, science and studies; and develop recommended MCLGs for select PFAS. MCLGs are nonenforceable, developed solely based on health effects and do not take into consideration other factors, such as technical limitations and cost. MCLGs are the starting point for determining MCLs.

Deliverables were completed in January 2021 and include the "Drexel PFAS Workbook" and "MCLG Drinking Water Recommendations for PFAS in the Commonwealth of PA" (MCLG Report), available at the following links: Workbook, https://files.dep.state.pa.us/PublicParticipation/Public%20Participation%20Center/PubPartCenterPortalFiles/Environmental%20Quality%20Board/2021/June%2015/03_PFAS%20Petition/01b_App%202%20Drexel%20PFAS%20Workbook%20January%202021.pdf and Report, https://files.dep.state.pa.us/PublicParticipation/Public%20Participation%20Center/PubPartCenterPortalFiles/Environmental%20Quality%20Board/2021/June%2015/03_PFAS%20Petition/01a_App%201%20Drexel%20PFAS%20Report%20January%202021.pdf. The MCLG Report was developed by the Drexel PFAS Advisory Group (DPAG)—a multidisciplinary team of experts in toxicology, epidemiology, and drinking water standards and risk assessment. The DPAG reviewed pertinent literature and work across the country and independently developed recommended MCLGs based on non-cancer endpoints. The MCLG Report discusses relevant inputs and includes a summary table for each PFAS that documents the development of the recommended MCLG. Table 2 includes the Reference Dose and recommended Chronic Non-Cancer MCLG for each PFAS that was reviewed.

Table 2. DPAG Reference Dose and Recommended Chronic Non-Cancer MCLGs.

DPAG Reference Dose and Recommended Chronic Non-Cancer MCLGs		
PFAS	*Reference Dose (ng/kg/day)*	*MCLG (ng/L or ppt)*
PFOA	3.9	8
PFOS	3.1	14
PFNA	2.2	6
PFHxS	4.0	20
PFHpA	None derived*	8
PFBS	39	55
GenX (HFPO-DA)	75	108

*Reference dose was not derived due to a lack of evidence on its toxicity. Recommended MCLG is based on its chemical structure.

As the DPAG explains in its MCLG Report, it "reviewed a number of recommendations made by EPA and State agencies that chose to create a summative approach to PFAS, combining multiple minimal risk levels or advisory levels into one cumulative drinking water value. No clear consensus exists on this approach and the use of the summative approach was clearly designed to be a shortcut based on a presumption that the agents all have similar health effects and end points. While this approach may work for other toxins such as dioxins, furans, and coplanar polychlorinated biphenols, it does not appear to be based on evidence available for PFAS. The DPAG therefore committed early in the process to developing an individual MCLG for each of the requested PFAS." (DPAG, January 2021)

The DPAG further describes in the MCLG Report that "For each of the PFAS studied, the DPAG identified points of departure (POD) and rationale for selection from risk assessments published by other States, the EPA and ATSDR (Agency for Toxic Substances and Disease Registry). DPAG then assessed the underlying critical studies driving the selection of the POD. Every effort was made to use the experience and published findings from other agencies and build and refine on these as much as possible into a best practice approach." (DPAG, January 2021)

In the "Drexel PFAS Workbook," the DPAG explains how threshold levels (such as advisory levels, MCLGs, MCLs) are generally determined, although each state's process can vary. Table 3, taken from the workbook, is a helpful tool in understanding the process. More detail about the DPAG's determination of MCLGs can be found as follows, under the subsections for PFOA and PFOS.

Table 3. How POD is Used to Calculate Reference Dose (RfD) and Threshold Level (DPAG, June 2020)

PFOA	
US EPA	
Office of Water 2016	
Standard / Guidance	Health Advisory
Media Type	Drinking Water
Threshold Level (ug/L) or (PPT)	0.07 ug/L 70 PPT (PFOA + PFOS cannot exceed this level)
Key Study Information	
Critical Effect Key Study Reference[1]	Developmental (reduced ossification, accelerated puberty) Lau, C., J.R. Thibodeaux, R.G. Hanson, M.G. Narotsky, J.M. Rogers, A.B. Lindstrom, and M.J. Strynar. 2006. Effects of perfluorooctanoic acid exposure during pregnancy in the mouse. Toxicological Science 90:510—518.
Species	Mice
Study Exposure Duration (days)	17 days
Kinetics	
Method of Administered Dose conversion to Internal Serum Level	Modeled AUC
Method to Derive Human Equivalent Dose	Dose adjustment factor of 0.00014 L/kg-day, based on first order kinetic clearance rate (Vd x (ln 2 ÷ t½))
Dose-Response	
Dose Response Modeling Method	LOAEL
POD[2]	38 mg/L
POD x DAF = Human Equivalent Dose[3]	0.0053 mg/kg/day
Uncertainty Extrapolation	
Human Variability (UFH)	10
Animal to Human (UFA)	3
Subchronic to Chronic (UFS)	1
LOAEL to NOAEL (UFL)	10
Database (UFD)	1

PFOA	
US EPA	
Total Composite (UFT)	300
HED/UFT= Reference Dose (mg/kg-day)[4]	(2 x 10-5 mg/kg-day) or 20 ng/kg/d
Receptor	Lactating women
Exposure	
Ingestion Rate (L/day)	
Body Weight (Kg)	
Normalized Drinking Water Intake (L/kg-day)	0.054
Relative Source Contribution	20%
Threshold Level (ug/L) or (PPT)[5]	0.07 ug/L 70 PPT (PFOA + PFOA cannot exceed this level)
Additional Information	90th percentile consumers only estimate of combined direct and indirect community water ingestion for lactating women (see Table 3-81 in USEPA 2011b).
Reference	Health Effects Support Document for Perfluorooctanoic Acid, U.S. Environmental Protection Agency Office of Water (4304T) Health and Ecological Criteria Division, EPA Document Number: 822-R-16-003. May 2016. And Drinking Water Health Advisory for Perfluorooctanoic Acid, U.S. Environmental Protection Agency Office of Water (4304T) Health and Ecological Criteria Division, EPA Document Number: 822-R-16-005. May 2016 https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos

Footnotes:

[1] Critical effect selected

[2] Point of Departure (POD) determined by critical review of study

[3] POD adjusted by using preferred methods to derive Human Equivalent Dose (HED)

[4] HED divided by Uncertainty Factors (UF) to achieve Reference Dose (RfD) in target population

[5] Final adjustment made based on intake to derive Threshold Level (e.g. MCL, MCLG, HAL, etc.)

Following completion of these two key projects—the PFAS Sampling Plan and the PFAS Toxicology Services Contract—the Department's Safe Drinking Water Program moved forward with developing a proposed PFAS MCL rule.

MCL rulemaking process

The Department must follow a rigorous process when setting an MCL. An MCL rulemaking must be based on available data, studies, and science, and must consider all factors as required by the Federal Safe Drinking Water Act (Federal Act) (42 U.S.C.A. §§ 300f—300j-27) and the Commonwealth's Regulatory Review Act (RRA) (71 P.S. §§ 745.1—745.14). Among other things, the Department must consider the following:

- Health effects,
- Occurrence data,
- Technical limitations such as available analytical methods and detection and reporting limits,
- Treatability of the contaminant and available treatment technologies, and
- Costs and benefits. (71 P.S. § 745.5b).

In addition to State requirements, the Department needs to consult the Federal Act and its implementing regulations. See 42 U.S.C.A. §§ 300f—300j-9; see also 40 CFR Parts 141, 142 and 143 (relating to National Primary Drinking Water Regulations; National Primary Drinking Water Regulations Implementation; and Other Safe Drinking Water Act Regulations). The EPA explains how the agency sets standards at the following link: www.epa.gov/sdwa/how-epa-regulates-drinking-water-contaminants. In establishing the MCLs in this proposed rulemaking, the Department was informed by the EPA's procedure to establish an MCL. It is important for the Department to understand the EPA's process of setting an MCL because similar criteria are required of the Department under the RRA and because the MCLs in this proposed rulemaking are the first MCLs that the Department has set; every other MCL in effect in this Commonwealth was set by the EPA and incorporated by reference into the Department's Chapter 109 regulations. In addition, to retain primacy for implementing the Federal Act in this Commonwealth, the Department's standard setting process must be at least as stringent as the Federal process.

After reviewing health effects data, the EPA sets an MCLG. MCLGs are nonenforceable public health goals. MCLGs consider only public health and not the limits of detection and treatment technology effectiveness. Therefore, MCLGs sometimes are set at levels which water systems cannot meet because of technical limitations.

Once the MCLG is determined, the EPA sets an enforceable standard. In most cases, the standard is an MCL. The MCL is set as close to the MCLG as feasible.

Taking cost into consideration, the EPA must determine the feasible MCL.

As a part of the rule analysis, the Federal Act requires the EPA to prepare a health risk reduction and cost analysis in support of any standard. The EPA must analyze the quantifiable and nonquantifiable benefits that are likely to occur as the result of compliance with the proposed standard. The EPA must also analyze increased costs that will result from the proposed drinking water standard. In addition, the EPA must consider incremental costs and benefits associated with the proposed alternative MCL values. Where the benefits of a new MCL do not justify the costs, the EPA may adjust the MCL to a level that maximizes health risk reduction benefits at a cost that is justified by the benefits.

The amendments to Chapter 109 in this proposed rulemaking include new MCLGs and MCLs for PFOA and PFOS. The amendments also include the provisions necessary to comply with the MCLs, including requirements for monitoring and reporting, public notification, consumer confidence reports, acceptable treatment technologies and analytical requirements.

The Department is proposing to not move forward with an MCL for other PFAS at this time due to the reasons outlined in Table 4.

Table 4. Reasons for not moving forward with MCLs for other PFAS.

	PFNA	*PFHxS*	*PFHpA*	*PFBS*	*HFPO-DA*
Lack of occurrence data > MCLG	x	x		x	x
Incomplete cost/benefit data and analysis	x	x	x	x	x
Reference dose was not derived due to lack of evidence on its toxicity			x		
Lack of treatability data					x

The decision to not move forward with MCLs for additional PFAS at this time is further supported by a review of co-occurrence data. This review considers the frequency with which individual PFAS detections co-occurred with other PFAS detections in the occurrence data set used for this proposed rulemaking. Based on an analysis of co-occurrence data, only 3.7% of all sites (or 16 out of 435 sites) had detections of at least 1 other PFAS at a level greater than its recommended MCLG when PFOA or PFOS levels did not exceed the proposed MCLs. In other words, the PFOA and PFOS proposed MCLs appear to be protective of other PFAS at least 96.3% of the time.

PFOA

PFOA—DPAG development of MCLG

After a literature search and a review of the available evidence and recommendations from various agencies, the DPAG developed an MCLG recommendation for PFOA of 8 ng/L or ppt based on non-cancer endpoints. The DPAG determined that the most relevant inputs were from the EPA, ATSDR, Minnesota Department of Health (MDH), New Jersey Department of Environmental Protection and Michigan Department of Health and Human Services (MDHHS).

The DPAG selected Koskela, et al. (2016) and Onishchenko, et al. (2011) as the critical studies, which identified developmental effects (including neurobehavioral and skeletal effects) as critical. The DPAG adopted the ATSDR's estimated Point of Departure (POD) of 8.29 mg/L. The DPAG followed the approaches used by MDHHS, MDH and ATSDR to select and determine the HED, UF, RfD, Relative Source Contribution (RSC) and recommended MCLG. Table 5 provides a summary of the DPAG's derivation of the MCLG for PFOA.

Table 5. DPAG Derivation of PFOA MCLG (DPAG, January 2021)

PFOA	
Drexel PFAS Advisory Group (DPAG) 2021	
Dose Response Modeling Method	*LOAEL*
POD	The average serum concentration was estimated in the mice (8.29 mg/L) using a three-compartment pharmacokinetic model (Wambaugh et al. 2013) using animal species, strain, sex-specific parameters. (ATSDR 2018)
HED = POD x DAF (mg/kg/d)	DAF = Ke x Vd Ke = 0.000825175 (8.2 x 10-4) based on a human serum half-life of 840 days (Bartell et al. 2010) Vd = 0.17 L/kg (Thompson et al. 2010) HED_{LOAEL} = POD_{LOAEL} x DAF HED_{LOAEL} = POD_{LOAEL} x Ke x Vd HED_{LOAEL} = 8.29 mg/L x 0.0000825175 x 0.17 L/kg HED_{LOAEL} = 0.001163 mg/kg/d or 1.163 x 10^{-3} mg/kg/d
Uncertainty Extrapolation	
Human Variability (UFH)	10 (standard)

PFOA	
Drexel PFAS Advisory Group (DPAG) 2021	
Dose Response Modeling Method	*LOAEL*
Animal to Human (UFA)	3 (DAF applied)
Subchronic to Chronic (UFS)	1 (Chronic effect studied)
LOAEL to NOAEL (UFL)	10 (standard)
Database (UFD)	1
Total Composite (UFT)	300
RfD = HED/UFT (mg/kg/d)	RfD = 0.001163 mg/kg/d/300 RfD = 3.9 ng/kg/day (3.9 x 10^{-6} mg/kg/d)
THSV = POD / UFT	THSV= 8.29 mg/L/ 300 THSV= 0.028 mg/L
Receptor	Infant exposure via breastmilk for 1 year, from mother chronically exposed via water, followed by lifetime of exposure via drinking water. Protective for short-term, subchronic and chronic. (also protective of formula fed infant). Goeden Model Parameters: Placental transfer of 87% and breastmilk transfer of 5.2% (MDH (2020 PFOA)). The Human Serum half-life is set at 840 days (Bartell et al. 2010). The Volume of distribution of 0.17 L/kg (Thompson et al. [2010]) Other factors include, 95th percentile drinking water intake, consumers only, from birth to more than 21 years old. Upper percentile (mean plus two standard deviations) breastmilk intake rate. Time-weighted average water ingestion rate from birth to 30-35 years of age is used to calculate maternal serum concentration at delivery. (Goeden et al. [2019]) A Relative Source Contribution of 50% (0.5) is applied and based on studies which showed that infants RSC is similar to NHANES 95th percentiles for 3-11 (2013-2014) and over 12 years old (2015-2016) participants. (CDC 2019)
Chronic Non-Cancer MCLG	The model produces a Chronic Non-Cancer MCLG of 8 ng/L (ppt). This protects health during the growth and development of a breast fed infant.

In summary, the DPAG recommended a chronic non-cancer MCLG for PFOA of 8 ng/L to protect breast-fed infants and throughout life.

The Board is proposing to set the MCLG for PFOA at the DPAG recommended level of 8 ng/L.

PFOA—occurrence data

Table 6 is a summary of occurrence data for PFOA. The data includes 412 results from the PFAS Sampling Plan and detect data from 23 sites under UCMR3 for a total of 435 sample results.

Table 6. PFOA Occurrence Data > MCLG of 8 ng/L

PFOA Occurrence Data > Proposed MCLG of 8 ng/L	
# of sites (of 435) > MCLG	46
% of sites > MCLG	10.6%
Estimated # of EPs (of 3785) > MCLG	400

A review of occurrence data indicates that 46 EPs out of a total number of 435 EPs sampled exceeded the proposed MCLG for PFOA of 8 ng/L. This represents 10.6% of all EPs sampled. This exceedance rate may overestimate the exceedance rate for other PWSs in this Commonwealth that were not sampled because the occurrence data sampling predominately targeted sites near potential sources of PFAS contamination. However, the occurrence data provides the most relevant information currently available on the prevalence and levels of PFAS in PWSs in this Commonwealth. Applying the occurrence data PFOA MCLG exceedance rate (10.6%) to the total number of EPs for all applicable PWSs (3,785 EPs), it is estimated that 400 EPs will exceed the proposed MCLG of 8 ng/L.

PFOA—proposed MCL of 14 ng/L

The Board is proposing an MCL of 14 ng/L for PFOA. The proposed MCL is based on the health effects and proposed MCLG, occurrence data, technical feasibility, and costs and benefits.

Table 7 is a summary of occurrence data for PFOA when compared to the proposed MCL of 14 ng/L.

Table 7. PFOA Occurrence Data > MCL of 14 ng/L

PFOA Occurrence Data > Proposed MCL of 14 ng/L	
# of sites (of 435) > MCL	25
% of sites > MCL	5.7%
Estimated # of EPs (of 3785) > MCL	218

A review of occurrence data indicates that 25 EPs out of a total number of 435 EPs sampled exceeded the proposed MCL for PFOA of 14 ng/L. This represents 5.7% of all EPs sampled. This exceedance rate may overestimate the exceedance rate for other PWSs in this Commonwealth that were not sampled because the occurrence data sampling predominately targeted sites near potential sources of PFAS contamination. However, the occurrence data provides the most relevant information currently available on the prevalence and levels of PFAS in PWSs in this Commonwealth. Applying the occurrence data PFOA MCL exceedance rate (5.7%) to the total number of EPs for all applicable PWSs (3,785 EPs), it is estimated that 218 EPs will exceed the proposed MCL of 14 ng/L.

Treatment cost estimates were determined based on a survey conducted of systems in this Commonwealth with existing PFAS treatment and of PFAS treatment manufacturers, an American Water Works Association pub-

lished PFAS Case Study and from information provided by members of the Association of State Drinking Water Administrators (ASDWA). Costs were provided for granular activated carbon (GAC), anion exchange (IX) and reverse osmosis (RO). The RO costs were not included in the final cost estimates because, due to wastewater disposal requirements, the technology is currently impractical. Additionally, the costs for GAC, IX and RO provided from the vendors were excluded from the final cost estimates because they were limited to media costs and did not include the infrastructure requirements.

Treatment capital costs were normalized to construction costs for treating 1 million gallons per day (MGD).

• The average capital cost for the GAC treatment was $3,457,110 per MGD per EP with an average annual operation and maintenance (O&M) cost of $171,970 per MGD per EP.

• The average capital cost for the IX treatment was $3,284,360 per MGD per EP with an average annual O&M cost of $155,666 per MGD per EP.

• The average capital cost for using either GAC or IX treatment is $3,370,735 per MGD per EP with an average annual O&M cost of $163,818 per MGD per EP.

• Annualized over 20 years at a 4% interest rate, the average annual capital cost for either GAC or IX treatment is $248,025 per MGD per EP.

Following is a summary of the estimated costs and benefits associated with the proposed MCL for PFOA of 14 ng/L. Section F of this preamble presents additional information on the costs and benefits of this proposed rulemaking. Treatment cost estimates are based on the costs to install and maintain treatment for a 1 MGD treatment plant. The actual costs would be expected to be proportionally less for a treatment plant with a smaller design capacity. For example, the average design capacity for small systems is 100,000 gallons per day, which is 1/10 of 1 MGD (that is, 0.1 MGD); treatment cost estimates for a small system with a design capacity of 0.1 MGD would be 1/10 of the cost estimates presented as follows.

• Estimated costs:

○ Estimated average annual compliance monitoring costs (@ $616/EP/Quarter) = $2.9 M

○ Estimated average annual treatment costs (average of GAC and IX) = $89.8 M per MGD + estimated annual performance monitoring costs = $4.8 M

• Estimated annual treatment capital costs, annualized over 20 years at 4% interest = $248,025 per MGD per EP × 218 EPs = $54.1 M per MGD

• Estimated annual treatment O&M costs = $35.7 M per MGD + estimated annual performance monitoring costs = $4.8 M

• Estimated annual treatment O&M costs = $163,818 per MGD per EP × 218 EPs = $35.7 M per MGD

• Estimated annual performance monitoring costs = $616 per sample per EP × 36 samples = $22,176 per EP × 218 EPs = $4.8 M

○ Estimated total annual costs = $89.8 M per MGD in treatment costs + $7.7 M in compliance monitoring and performance monitoring costs

• Estimated benefits:

○ 90% improvement in health protection as compared to current EPA HAL of 70 ppt

Table 8 provides a comparison of annual costs and benefits for the proposed MCL for PFOA of 14 ng/L, EPA's HAL of 70 ng/L, and other values considered for the proposed MCL. Performance monitoring costs are considered part of treatment O&M costs because performance monitoring is used to make operational decisions, such as when to change out treatment media.

Table 8. PFOA Comparison of Annual Costs and Benefits

PFOA Annual Costs and Benefits Analysis								
Value (ng/L)	*Estimated # of EPs (of 3,785) > Value*	*Compliance Monitoring Costs (Millions)*	*Treatment O&M Costs*		*Treatment Capital Costs (Millions) per MGD* annualized over 20 years*	*Total Costs (Millions)*	*% Increase in Cost Compared to HAL*	*% Improvement in Health Protection Compared to HAL*
			*Treatment O&M Costs (Millions) per MGD**	*Performance Monitoring Costs (Millions)*				
HAL = 70	58	$2.46	$9.50	$1.29	$14.39	$27.63	0%	0%
35	78	$2.56	$12.78	$1.73	$19.35	$36.41	32%	56%
20	200	$2.73	$32.76	$4.44	$49.60	$89.53	224%	80%
MCL = 14	218	$2.89	$35.71	$4.83	$54.07	$97.51	253%	90%
12	270	$2.97	$44.23	$5.99	$66.97	$120.15	335%	93%
10	313	$3.07	$51.28	$6.94	$77.63	$138.92	403%	96%
MCLG = 8	400	$3.39	$65.53	$8.87	$99.21	$177.00	541%	100%

*For purposes of totaling annual costs, the costs that vary with design capacity (treatment O&M and treatment capital costs) were multiplied by a benchmark design capacity of 1 MGD.

In evaluating the costs and benefits, the Department's goal was to provide at least a 90% reduction in adverse health effects (a 90% improvement in health protection) when compared to the HAL of 70 ng/L. This goal is consistent with several existing drinking water standards including the following standards:

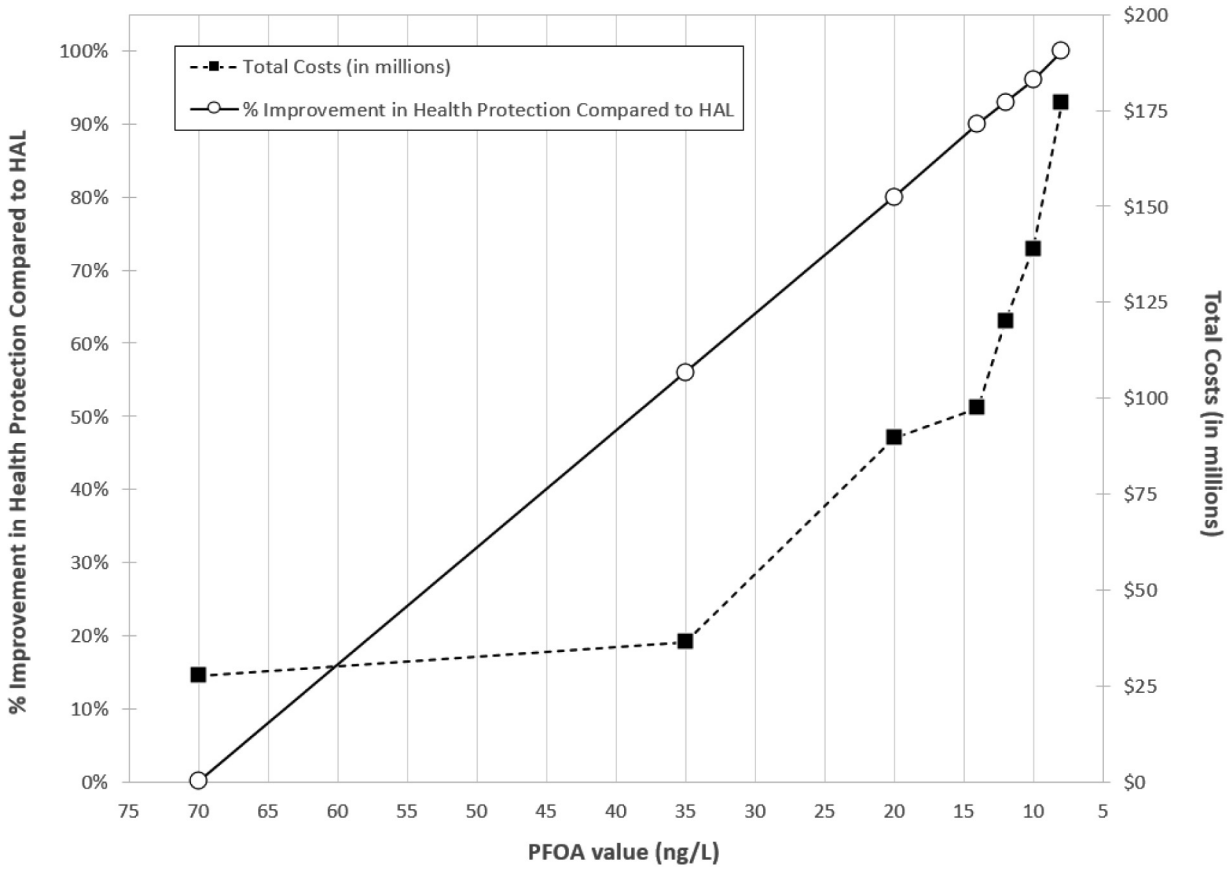
• the requirement to achieve at least a 90% inactivation of *Giardia* cysts using disinfection processes within a filtration plant (§ 109.202(c)(1)(ii) (relating to State MCLs, MRDLs and treatment technique requirements) regarding treatment technique requirements for pathogenic bacteria, viruses and protozoan cysts);

• the use of the 90th percentile lead and copper levels when determining compliance with the lead and copper action levels of 0.015 mg/L and 1.3 mg/L, respectively (§ 109.1102(a) (relating to action levels and treatment technique requirements) regarding action levels for lead and copper), and

• the requirement to meet the filtered water turbidity standards in 95% of measurements taken each month (§ 109.202(c)(1)(i)).

As shown in Table 8 and Figure 1, additional improvement in public health benefits at PFOA values lower than the proposed MCL of 14 ng/L would require increasingly steep costs. For example, compared with the proposed MCL of 14 ng/L, an MCL value of 10 ng/L is estimated to achieve an additional 6% increase at an additional annual cost of approximately $41.4 million (Table 8, Figure 1), which is a rate of approximately $7 million in additional annual costs for every additional 1% of benefits. Compared with the HAL, the proposed MCL of 14 ng/L is estimated to achieve a 90% improvement in public health benefits at an additional annual cost of roughly $70 million, which is a rate of approximately $0.8 million in additional annual costs for every additional 1% of benefits.

Figure 1. Annual Total Costs and Benefits (% Health Protection Improvement) at Various PFOA levels



For the aforementioned reasons, the Department believes that the proposed MCL for PFOA of 14 ng/L strikes an appropriate balance between the benefits (90% improvement in public health) and costs (253% increase in costs) when compared to the benefits and costs associated with meeting the HAL of 70 ng/L.

PFOS

PFOS—DPAG development of MCLG

After a literature search and a review of the available evidence and recommendations from various agencies, the DPAG developed an MCLG recommendation for PFOS of 14 ng/L or ppt based on non-cancer endpoints. The DPAG referenced inputs from the EPA, ATSDR, MDH and MDHHS.

The DPAG selected Dong, et al. (2011) as the critical study, which identified immunotoxicity effects (including immune suppression) as critical. The DPAG determined that a POD of 2.36 mg/L is appropriate. The DPAG followed the approaches used by MDHHS, MDH and the EPA to select and determine the HED, UF, RfD, RSC and recommended MCLG. Table 9 provides a summary of the DPAG's derivation of the MCLG for PFOS.

Table 9. DPAG Derivation of PFOS MCLG (DPAG, January 2021)

PFOS	
Drexel PFAS Advisory Group (DPAG) 2021	
Dose Response Modeling Method	*NOAEL*
POD	2.36 µg/mL (or 2.36 mg/L)
HED = POD x DAF (mg/kg/d)	Toxicokinetic Adjustment based on Chemical- Specific Clearance Rate (Li et al 2018, MDH 2020 PFOS) DAF = Vd (L/kg) x (Ln2/Half-life, days) DAF = 0.23 L/kg x (0.693/1241 days) = DAF = 0.00013 L/kg/d HED = POD x DAF (mg/kg/d) HED = 2.36 mg/L x 0.00013 L/kg/d HED = 0.000307 mg/kg/d
Uncertainty Extrapolation	
Human Variability (UFH)	10
Animal to Human (UFA)	3 (DAF applied)
Subchronic to Chronic (UFS)	1
LOAEL to NOAEL (UFL)	1
Database (UFD)	3
Total Composite (UFT)	100
RfD = HED/UFT (mg/kg/d)	RfD = HED/UFT (mg/kg/d) RfD = 0.000307 mg/kg-d/100 RfD = 3.1 ng/kg/d or 3.1 x 10^{-6} mg/kg-d
THSV = POD/UFT	ITSHV = 2.36 mg/L/100 ITSHV = 0.024 mg/mL
Receptor	Infant exposure via breastmilk for 1 year, from mother chronically exposed via water, followed by lifetime of exposure via drinking water. Protective for short-term, subchronic and chronic. The 95th percentile water intake rates (Table 3-1 and 3-3, USEPA 2019) or upper percentile breastmilk intake rates (Table 15-1, USEPA 2019) were used. Breast-fed infant, which is also protective of a formula-fed infant using Minnesota Department of Health Model based on Goeden (2019). Placental transfer of 40% (MDH 2020 PFOS). Breastmilk transfer of 1.7% (MDH 2020 PFOS). Human Serum half-life of 1241 days (Li et al. 2018) Volume of distribution of 0.23 L/kg (USA EPA 2016c) 95th percentile drinking water intake, consumers only, from birth to more than 21 years old (Goeden [2019]) Upper percentile (mean plus two standard deviations) breast milk intake rate (Goeden [2019]) Time-weighted average water ingestion rate from birth to 30-35 years of age (to calculate maternal serum concentration at delivery) (Goeden [2019])
Chronic Non-Cancer MCLG	The model produces a Chronic Non-Cancer MCLG of 14 ng/L (ppt). This protects health during the growth and development of a breast fed infant.

In summary, the DPAG recommended a chronic non-cancer MCLG for PFOS of 14 ng/L to protect breast-fed infants and throughout life.

The Board is proposing to set the MCLG for PFOS at the DPAG recommended level of 14 ng/L.

PFOS—occurrence data

Table 10 is a summary of occurrence data for PFOS. The data includes 412 results from the PFAS Sampling Plan and detect data from 23 sites under UCMR3 for a total of 435 sample results.

Table 10. PFOS Occurrence Data > MCLG of 14 ng/L

PFOS Occurrence Data > Proposed MCLG of 14 ng/L	
# of sites (of 435) > MCLG	23
% of sites > MCLG	5.3%
Estimated # of EPs (of 3785) > MCLG	200

A review of occurrence data indicates that 23 EPs out of a total number of 435 EPs sampled exceeded the proposed MCLG for PFOS of 14 ng/L. This represents 5.3% of all EPs sampled. This exceedance rate may overestimate the exceedance rate for other PWSs in this Commonwealth that were not sampled because the occurrence data sampling predominately targeted sites near potential sources of PFAS contamination. However, the occurrence data provides the most relevant information currently available on the prevalence and levels of PFAS in PWSs in this Commonwealth. Applying the occurrence data PFOS MCLG exceedance rate (5.3%) to the total number of EPs for all applicable PWSs (3,785 EPs), it is estimated that 200 EPs will exceed the proposed MCLG of 14 ng/L.

PFOS—proposed MCL of 18 ng/L

The Board is proposing an MCL of 18 ng/L for PFOS. The proposed MCL is based on the health effects and proposed MCLG, occurrence data, technical feasibility, and costs and benefits.

Table 11 is a summary of occurrence data for PFOS when compared to the proposed MCL of 18 ng/L.

Table 11. PFOS Occurrence Data > MCL of 18 ng/L

PFOS Occurrence Data > Proposed MCL of 18 ng/L	
# of sites (of 435) > MCL	22
% of sites > MCL	5.1%
Estimated # of EPs (of 3785) > MCL	191

A review of occurrence data indicates that 22 EPs out of a total number of 435 EPs sampled exceeded the proposed MCL for PFOS of 18 ng/L. This represents 5.1% of all EPs sampled. This exceedance rate may overestimate the exceedance rate for other PWSs in this Commonwealth that were not sampled because the occurrence data sampling predominately targeted sites near potential sources of PFAS contamination. However, the occurrence data provides the most relevant information currently available on the prevalence and levels of PFAS in PWSs in this Commonwealth. Applying the occurrence data PFOS MCL exceedance rate (5.1%) to the total number of EPs for all applicable PWSs (3,785 EPs), it is estimated that 191 EPs will exceed the proposed MCL of 18 ng/L.

Following is a summary of the estimated costs and benefits associated with the proposed MCL for PFOS of 18 ng/L. Section F of this preamble presents additional information on the costs and benefits of this proposed rulemaking. Treatment cost estimates are based on the costs to install and maintain treatment for a 1 MDG treatment plant. The actual costs would be expected to be proportionally less for a treatment plant with a smaller design capacity. For example, the average design capacity for small systems is 100,000 gallons per day, which is 1/10 of 1 MGD (that is, 0.1 MGD); treatment cost estimates for a small system with a design capacity of 0.1 MGD would be 1/10 of the cost estimates presented as follows:

- Estimated costs:

○ Estimated average annual compliance monitoring costs (@ $616/EP/Quarter) = $2.7 M

○ Estimated average annual treatment costs (average of GAC and IX) = $78.7 M per MGD + estimated annual performance monitoring costs = $4.2 M

- Estimated annual treatment capital costs, annualized over 20 years at 4% interest = $248,025 per MGD per EP × 191 EPs = $47.4 M per MGD

- Estimated annual treatment O&M costs = $31.3 M per MGD + estimated annual performance monitoring costs = $4.2 M

- Estimated annual treatment O&M costs = $163,818 per MGD per EP × 191 EPs = $31.3 M per MGD

- Estimated annual performance monitoring costs = $616 per sample per EP × 36 samples = $22,176 per EP × 191 EPs = $4.2 M

○ Estimated total annual costs = $78.7 M per MGD in treatment costs + $6.9 M in compliance monitoring and performance monitoring costs

- Estimated benefits:

○ 93% improvement in health protection as compared to current EPA HAL of 70 ppt

Table 12 provides a comparison of annual costs and benefits for the proposed MCL for PFOS of 18 ng/L, EPA's HAL of 70 ng/L and other values considered for the proposed MCL. Performance monitoring costs are considered part of treatment O&M costs because performance monitoring is used to make operational decisions, such as when to change out treatment media.

Table 12. PFOS Comparison of Annual Costs and Benefits

PFOA Annual Costs and Benefits Analysis								
Value (ng/L)	*Estimated # of EPs (of 3,785) > Value*	*Compliance Monitoring Costs (Millions)*	*Treatment O&M Costs*		*Treatment Capital Costs (Millions) per MGD* annualized over 20 years*	*Total Costs (Millions)*	*% Increase in Cost Compared to HAL*	*% Improvement in Health Protection Compared to HAL*
			*Treatment O&M Costs (Millions) per MGD**	*Performance Monitoring Costs (Millions)*				
HAL = 70	96	$2.57	$15.73	$2.13	$23.81	$44.24	—	—
35	148	$2.64	$24.25	$3.28	$36.71	$66.87	51%	63%
20	183	$2.70	$29.98	$4.06	$45.39	$82.13	86%	89%
MCL = 18	191	$2.70	$31.29	$4.24	$47.37	$85.60	94%	93%
16	200	$2.73	$32.76	$4.44	$49.60	$89.53	102%	96%
15	200	$2.81	$32.76	$4.44	$49.60	$89.61	103%	98%
MCLG = 14	200	$2.88	$32.76	$4.44	$49.60	$89.68	103%	100%

*For purposes of totaling annual costs, the costs that vary with design capacity (treatment O&M and treatment capital costs) were multiplied by a benchmark design capacity of 1 MGD.

In evaluating the costs and benefits, the Department's goal was to provide at least a 90% reduction in adverse health effects (a 90% improvement in health protection) when compared to the HAL of 70 ng/L. This goal is consistent with several existing drinking water standards including the following standards:

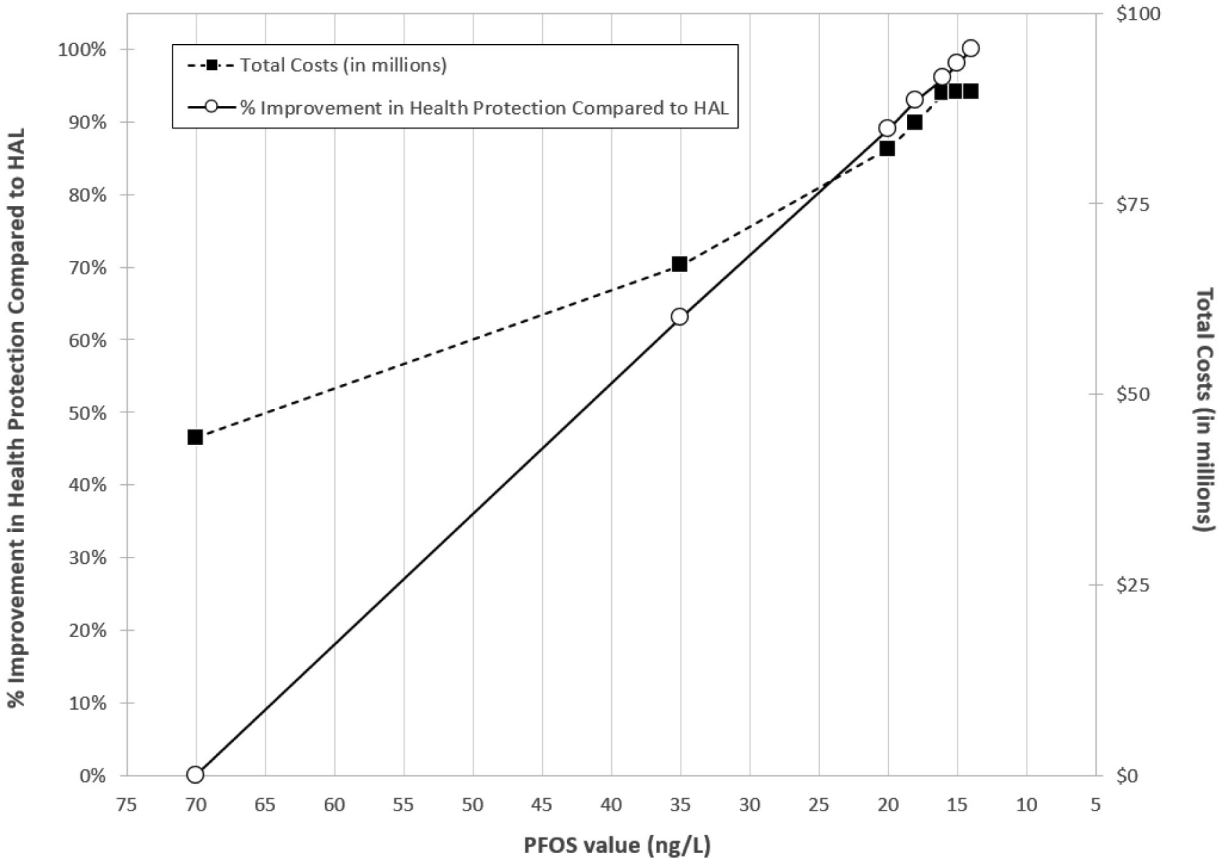
- the requirement to achieve at least a 90% inactivation of *Giardia* cysts using disinfection processes within a filtration plant (§ 109.202(c)(1)(ii) regarding treatment technique requirements for pathogenic bacteria, viruses and protozoan cysts);

• the use of the 90th percentile lead and copper levels when determining compliance with the lead and copper action levels of 0.015 mg/L and 1.3 mg/L, respectively (§ 109.1102(a)), and

• the requirement to meet the filtered water turbidity standards in 95% of measurements taken each month (§ 109.202(c)(1)(i)).

As shown in Table 12 and Figure 2, additional improvement in public health benefits at PFOS values lower than the proposed MCL of 18 ng/L would require increasingly steep costs. For example, compared with the proposed MCL of 18 ng/L, an MCL value of 16 ng/L is estimated to achieve an additional 3% increase at an additional annual cost of approximately $3.9 million (Table 12, Figure 2), which is a rate of approximately $1.3 million in additional annual costs for every additional 1% of benefits. Compared with the HAL, the proposed MCL of 18 ng/L is estimated to achieve a 93% improvement in public health benefits at an additional annual cost of roughly $41.4 million, which is a rate of approximately $0.4 million in additional annual costs for every additional 1% of benefits.

Figure 2. Annual Total Costs and Benefits (% Health Protection Improvement) at Various PFOS levels



For the aforementioned reasons, the Department believes that the proposed MCL for PFOS of 18 ng/L strikes a balance between the benefits (93% improvement in public health) and costs (94% increase in costs) when compared to the benefits and costs associated with meeting the HAL of 70 ng/L.

State data

Currently, six other states have set MCLs for select PFAS, including PFOA and PFOS, as summarized in Table 13. The proposed MCLs for the Commonwealth are of comparable magnitude as the other state standards.

Table 13. PFOA and PFOS MCLs (in ng/L) from Six Other States

	NY	*MI*	*NJ*	*NH*	*PA*	*MA*	*VT*
PFOA	10	8	14	12	14	20*	20*
PFOS	10	16	13	15	18	20*	20*

*The MCL for MA & VT is for a group of 5 (VT) or 6 (MA) PFAS, including PFOA and PFOS (not individual contaminants).

Advisory Committee review

The Public Water System Technical Assistance Center (TAC) Board reviewed the pre-draft proposed rulemaking on July 29, 2021, and recommended that the pre-draft rulemaking move forward to the Board as a proposed rulemaking.

References

American Water Works Association (AWWA), 2020, "PFAS Case Study: Cape Fear Public Utility Authority (CFPUA)."

ASDWA, October 2020, "Per- and Polyfluoroalkyl Substances (PFAS) and State Drinking Water Program Challenges."

ASDWA, October 2020, "Technical Bulletin to Laboratories Reporting PFAS Analysis Using EPA Methods 533, 537, or 537.1."

ASDWA, February 2021, "Per- and Polyfluoroalkyl Substances (PFAS) Laboratory Testing Primer for State Drinking Water Programs and Public Water Systems."

Buck, R.C. et al., 2011, "Perfluoroalkyl and Polyfluoroalkyl Substance in the Environment: Terminology, Classification, and Origins," *Integrated Environmental Assessment and Management*, Vol. 7, No. 4, pp. 513—541.

California Water Boards, October 2020, "Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS)", www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/PFOA_PFOS.html

Connecticut Water, "What Are PFAS?" www.ctwater.com/water-quality/what-are-pfas

DPAG, June 2020, "Drexel PFAS Workbook." https://files.dep.state.pa.us/PublicParticipation/Public%20Participation%20Center/PubPartCenterPortalFiles/Environmental%20Quality%20Board/2021/June%2015/03_PFAS%20Petition/01b_App%202%20Drexel%20PFAS%20Workbook%20January%202021.pdf

DPAG, January 2021, "Maximum Contaminant Level Goal Drinking Water Recommendations for Per- and Polyfluoroalkyl Substances (PFAS) in the Commonwealth of Pennsylvania." https://files.dep.state.pa.us/PublicParticipation/Public%20Participation%20Center/PubPartCenterPortalFiles/Environmental%20Quality%20Board/2021/June%2015/03_PFAS%20Petition/01a_App%201%20Drexel%20PFAS%20Report%20January%202021.pdf

Kwiatkowski, C.F. et al., 2020, "Scientific Basis for Managing PFAS as a Chemical Class," *Environmental Science and Technology Letters*, Vol. 7, pp. 532—543.

Longsworth, Sarah Grace, 2020, "Processes and Considerations for Setting State PFAS Standards," Environmental Council of the States.

Massachusetts DEP, November 2020, "310 CMR 22.00: The Massachusetts Drinking Water Regulations."

Michigan Administrative Code(s) for Environment, Great Lakes, and Energy—Drinking Water and Environmental Health Division, August 2020 updated, "Supplying Water to the Public."

Minnesota Department of Health, "Perfluoroalkyl Substances (PFAS)", www.health.state.mn.us/communities/environment/hazardous/topics/pfcs.html#safelevels

New Hampshire Department of Environmental Services, "New Hampshire Code of Administrative Rules," Parts Env-Dw 705, 707, 708, 712, 800, 2021.

New Jersey Department of Environmental Protection, March 2020, "Ground Water Quality Standards and Maximum Contaminant Levels (MCLs) for Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS)."

New York State Department of Health, July 2020, "Maximum Contaminant Levels (MCLs)."

Ohio Department of Health and Ohio Environmental Protection Agency, December 2019, "Ohio Per- and Polyfluoroalkyl Substances (PFAS) Action Plan for Drinking Water."

PA DEP, April 2019, "Pennsylvania Department of Environmental Protection Bureau of Safe Drinking Water PFAS Sampling Plan."

PA DEP, May 2021, "Summary of Responses from Survey of Pennsylvania Accredited Laboratories for PFAS."

PA DEP, May 2021, "Summary of Results for SDW Sampling Project Using EPA Method 537.1."

PA DEP, July 2021, "PFAS Monitoring Costs."

PA DEP, July 2021, "PFAS Treatment Survey Response Summary."

Post, Gloria B., August 2020, "Recent US State and Federal Drinking Water Guidelines for Per- and Polyfluoroalkyl Substances," *Environmental Toxicology and Chemistry*, Volume 00, Number 00, pp. 1—14.

Rosenblum, Laura and Steven C. Wendelken, November 2019, "Method 533: Determination of Per- and Polyfluoroalkyl Substances in Drinking Water by Isotope Dilution Anion Exchange Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry," US EPA Office of Water, EPA Document No. 815-B-19-020.

Shoemaker, J.A. and D.R. Tettenhorst, November 2018, "Method 537.1. Determination of Selected Per-and Polyfluorinated Alkyl Substances in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MC/MC)," Version 1.0, US EPA Office of Research and Development, EPA Document # EPA/600/R-18/352.

Shoemaker, J.A., P.E. Grimmett, and B.K. Boutin, September 2009, "Method 537. Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MC/MC)," Version 1.1, US EPA Office of Research and Development, EPA Document # EPA/600/R-08/092.

US EPA, May 2016, "Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA)," EPA 822-R-16-005.

US EPA, May 2016, "Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS)," EPA 822-R-16-004.

US EPA, May 2016, "Health Effects Support Document for Perfluorooctanoic Acid (PFOA)," EPA 822-R-16-003.

US EPA, May 2016, "Heath Effects Support Document for Perfluorooctane Sulfonate (PFOS)," EPA 822-R-16-002.

US EPA, January 2018, "UCMR 3 Occurrence Data by State."

US EPA, February 2020, "EPA PFAS Action Plan: Program Update."

US EPA, March 2021, "Announcement of Final Regulatory Determinations for Contaminants on the Fourth Drinking Water Contaminant Candidate List," *Federal Register*, Vol. 86, No. 40.

US EPA, March 2021, "Revisions to the Unregulated Contaminant Monitoring Rule (UCMR 5) for Public Water Systems and Announcement of Public Meeting," *Federal Register*, Vol. 86, No. 46, pp. 13846-13872.

Vermont Agency of Natural Resources, Department of Environmental Conservation, Drinking Water and Groundwater Protection Division, March 2020 updated, "Environmental Protection Rules Chapter 21 Water Supply Rule."

E. *Summary of Regulatory Requirements*

§ 109.1. Definitions

A definition for the acronym "CASRN—Chemical Abstracts Service Registry Number" is proposed to be added because the CASRN numbers are included for each of the individual PFAS compounds included in the regulation.

A definition for "GAC—Granular Activated Carbon" is proposed to be added because GAC is one of the treatment technologies considered acceptable for PFAS removal.

A definition for "MCLG—Maximum Contaminant Level Goal" is proposed to be added. The definition is from 40 CFR 141.2 (relating to definitions) with added text referencing MCLGs established under both the Federal and State acts.

The acronym "MDL" is proposed to be added to the existing definition "Method detection limit" with the amended definition alphabetically reordered. The definition for "Method detection limit" is also proposed to be amended to be consistent with the current definition in the Federal regulations at 40 CFR Part 136 Appendix B (relating to definition and procedure for the determination of the method detection limit—revision 2).

A definition for "MRL—Minimum reporting level" is proposed to be added.

Definitions for the following acronyms are proposed to be added: "PFAS," "PFOA" and "PFOS." Definitions for individual compounds include the CASRN number to eliminate confusion as to the specific chemical form that is included in the regulation.

A definition for "Performance Evaluation Sample" is proposed to be added to be consistent with Federal language.

The existing definition for "Reliably and consistently below the MCL" is proposed to be amended to add "PFAS" defined as less than 80% of the MCL.

§ 109.202. State MCLs, MRDLs and treatment technique requirements

Proposed subsection (a)(4) for "Other MCLs" would add MCLs and MCLGs for PFOA and PFOS, with an effective date of the publication of the final-form rulemaking. The MCLs and MCLGs are listed in both milligrams per liter (mg/L), which are the traditional units for MCLs, as well as in nanograms per liter (ng/L) for clarity, since the numbers are so low.

§ 109.301. General monitoring requirements

The duplicated text in paragraph (2)(iv) through (iii) regarding performance monitoring for unfiltered surface water and GUDI, which was inadvertently added following the last regulatory update at 48 Pa.B. 4974 (August 18, 2018), is proposed to be deleted.

Paragraph (6)(vii)(A)(I) and (II) are proposed to be amended for consistency with existing definitions that were amended in 2018 and to clarify that the Zone I and Zone II wellhead protection areas and the Zone A and Zone B surface water intake protection areas are defined in § 109.1 (relating to definitions). The proposed amendments would apply to waivers issued for synthetic organic chemicals (SOCs).

Paragraph (8)(iii) is proposed to be amended to clarify that consecutive water systems may be exempt from PFAS monitoring, in addition to VOCs, SOCs, IOCs and radionuclides.

Paragraph (9) is proposed to be amended to clarify monitoring requirements for point-of-entry (POE) devices. A POE device is installed on the service line to a house, building or other facility for the purpose of reducing contaminants in the water distributed to that property and is used as an alternative to centralized water treatment. POE devices must meet design and construction standards and may only be used as a treatment option by very small PWSs that serve 100 or fewer people for treating sources that were permitted prior to 1992; the POE device must be installed on every connection unless the PWS can demonstrate that water provided to a service connection meets water quality standards. See 25 Pa. Code § 109.612 (relating to POE devices). As a result, POE devices are often not cost effective and currently there are no PWSs in this Commonwealth that have a permit for POE devices. However, the Commonwealth is required to maintain requirements for POE devices to comply with Federal safe drinking water requirements. Consequently, monitoring requirements for POE devices are proposed to be added for PFAS, as well as additional contaminants, as applicable, to correct the omission of paragraphs (10)—(15) and Subchapter K (relating to lead and copper). These requirements should have been added in previous rulemakings but were mistakenly overlooked due to no PWSs in this Commonwealth having a permit for POE devices.

Paragraph (11) is proposed to be amended to clarify that for EPs that do not provide water continuously, monitoring for PFAS is not required during quarters when water is not provided to the public.

Paragraph (15)(i) and (ii) are proposed to be amended to clarify monitoring for PFAS for reserve EPs and EPs that receive water from a reserve source.

Proposed paragraph (16) describes new monitoring requirements for PFAS for community water systems and nontransient noncommunity water systems. Throughout paragraph (16), the proposed provisions utilize terms of art and phrasing that mirror Federal safe drinking water regulations and are consistent with language used throughout the Department's safe drinking water regulations in Chapter 109.

Proposed paragraph (16)(i)(A)—(C) specify the initial monitoring requirements for PFAS. Initial monitoring consists of four consecutive quarterly samples at each EP, beginning January 1, 2024, for systems serving more than 350 persons and beginning January 1, 2025, for systems serving 350 or fewer persons.

Proposed paragraph (16)(ii)(A)—(C) specify the repeat monitoring requirements for EPs at which at least one of the PFAS with an MCL established under § 109.202(a)(4) is detected at a level equal to or greater than its MRL as defined in § 109.304(f) (relating to analytical requirements).

Proposed paragraph (16)(iii) specifies the repeat monitoring requirements for EPs at which none of the PFAS with an MCL established under § 109.202(a)(4) are detected during initial monitoring.

Proposed paragraph (16)(iv) specifies the repeat monitoring requirements for EPs at which at least one of the PFAS with an MCL established under § 109.202(a)(4) exceeds its corresponding MCL.

Proposed paragraph (16)(v) requires collection of confirmation samples for each PFAS detected in exceedance of its MCL and the timing for collection of confirmation samples.

Proposed paragraph (16)(vi) specifies the repeat and performance monitoring requirements for EPs with PFAS removal treatment.

Proposed paragraph (16)(vii) describes the process by which systems may be able to obtain a monitoring waiver for PFAS. Systems using groundwater or groundwater under the direct influence of surface water monitoring under § 109.301(16)(ii) (relating to general monitoring requirements) may apply for a use waiver for EPs with 3 consecutive years or quarterly or annual samples with no detection of any PFAS with an MCL established under § 109.202(a)(4).

Proposed paragraph (16)(viii) specifies when PFAS samples may be invalidated and utilizes the term "obvious sampling errors" consistent with 40 CFR 141.24(f)(13) and (h)(9) (relating to organic chemicals, sampling and analytical requirements).

Proposed paragraph (16)(ix) specifies how compliance with the PFAS MCLs is determined.

§ 109.303. Sampling requirements

Subsection (a)(4) is proposed to be amended to delete an incorrect cross reference to § 109.302(f) regarding special monitoring requirements. The special monitoring requirements under § 109.302(f) relate to groundwater under the direct influence of surface water and are taken from the collection facilities (raw source water) and not the EP to the distribution system.

Proposed subsection (a)(6) specifies the sampling requirements for PFAS. Samples must be collected at the EP and be representative of each source during normal operating conditions. Samples must be collected by a properly trained sample collector.

§ 109.304. Analytical requirements

Proposed subsection (f) specifies the analytical requirements for the PFAS with an MCL.

Proposed subsection (f)(1) specifies acceptable analytical methods and MRLs. The MRLs for PFOA and PFOS are set at 5 ng/L. This level was determined through the survey conducted by the Department of laboratories accredited by this Commonwealth for PFAS analysis. It was determined using the Department's experience with laboratories finding a balance between reporting to a low level and still meeting all method required quality control.

Proposed subsection (f)(2) specifies the requirement that analysis must be conducted by a laboratory accredited by the Department.

Proposed subsection (f)(3) specifies the requirement for laboratories to determine MDLs for each analyte.

Proposed subsection (f)(4) specifies the requirements for laboratories to analyze performance evaluation samples at least annually.

Proposed subsection (f)(5) requires that the MRL must be contained within the range of calibration.

§ 109.411. Content of a public notice

Subsection (e)(1) is proposed to be amended for formatting purposes to place the existing requirement to use the health effects language for fluoride in each Tier 2 public notice into a separate subparagraph.

Proposed subsection (e)(1)(i) includes the relocated requirement to use the health effects language for fluoride, which was previously included in § 109.411(e)(1) (relating to content of a public notice).

Proposed subsection (e)(1)(ii) and (iii) add the requirement to include the health effects language for PFOA or PFOS in each Tier 2 public notice for violation of the respective primary MCL, and includes the health effects language that must be used.

§ 109.416. CCR requirements

Proposed paragraph (3.1) adds consumer confidence report (CCR) reporting requirements for PFAS with an MCL.

Proposed paragraph (3.1)(i)(A)—(G) specify the information on detected results that must be reported.

Proposed paragraph (3.1)(ii) requires that the respective health effects language in § 109.411(e)(1)(ii) and (iii) must be included for violation of a primary MCL for PFOA or PFOS.

§ 109.503. Public water systems construction permits

Proposed subsection (a)(1)(iii)(D)(XIV.1) would add new source sampling requirements for PFAS.

§ 109.602. Acceptable design

Proposed subsection (j) identifies treatment technologies considered acceptable by the Department for compliance with the PFAS MCLs.

§ 109.701. Reporting and recordkeeping

Subsection (a)(3)(ii) is proposed to be amended to clarify that 1-hour reporting is required when a sample result requires collection of a confirmation or check sample. The word "confirmation" is proposed to be added because the terms "check" and "confirmation sample" are often used interchangeably but each are used in different locations in § 109.301. Under proposed § 109.301(16)(v), a confirmation sample shall be collected when PFAS is detected in exceedance of its respective MCL.

§ 109.1003. Monitoring requirements

The proposed provisions for this section utilize terms of art and phrasing that mirror Federal safe drinking water regulations and are consistent with language used throughout the Department's safe drinking water regulations in Chapter 109.

Proposed subsection (a)(1)(xv) identifies the PFAS monitoring requirements for bottled, vended, retail and bulk (BVRB) water systems. Compliance monitoring for all BVRB systems begins January 1, 2024.

Proposed subsection (a)(1)(xv)(A) identifies the PFAS monitoring exemption for BVRB systems that obtain finished water from another permitted public water system.

Proposed subsection (a)(1)(xv)(B) identifies the initial PFAS monitoring requirements for BVRB systems. Initial monitoring consists of 4 consecutive quarters at each entry point.

Proposed subsection (a)(1)(xv)(C)(I) and (II) identify the repeat PFAS monitoring requirements for BVRB systems.

Proposed subsection (a)(1)(xv)(D) identifies the confirmation sampling requirements for PFAS monitoring for BVRB systems that detect a PFAS in exceedance of its MCL during annual monitoring.

Proposed subsection (a)(1)(xv)(E) identifies the repeat and performance PFAS monitoring requirements for BVRB systems with PFAS removal treatment.

Proposed subsection (a)(1)(xv)(F)(I) and (II) specify when PFAS samples may be invalidated for BVRB systems and utilize the term "obvious sampling errors" consistent with 40 CFR 141.24(f)(13) and (h)(9).

Proposed subsection (a)(1)(xv)(G) identifies how compliance with the PFAS MCLs is determined for BVRB systems.

Subsection (b)(3) is proposed to be amended to clarify that sampling and analysis for PFAS must be in accordance with the requirements in § 109.304.

Subsection (b)(6) is proposed to be amended to delete language that is also in subsection (b)(3), and to add the requirement that compliance monitoring samples for PFAS for BVRB systems must be collected by a properly trained sample collector.

§ 109.1403. Monitoring waiver fees

Subsection (a) is proposed to be amended to add a PFAS use waiver fee of $100.

F. *Benefits, Costs and Compliance*

Benefits

The proposed PFOA and PFOS MCLs will apply to all 3,117 community, nontransient noncommunity and BVRB water systems in this Commonwealth. Of these, 1,905 are community water systems, serving a combined population of approximately 11.4 million Pennsylvanians. Another 1,096 are nontransient noncommunity water systems serving approximately 507,000 persons.

The benefits associated with reductions of PFOA and PFOS in drinking water arise from a reduction in adverse human health effects. Exposure to PFOA is associated with adverse developmental effects (including neurobehavioral and skeletal effects) and exposure to PFOS is associated with adverse immune system impacts (including immune suppression). Benefits may also be derived from customer actions to avoid exposure, such as a customer's purchase of bottled water or the installation and operation of home water treatment systems.

The benefits of proposed MCLs can be presented as a percent improvement in public health protection as compared to EPA's HAL of 70 ng/L. Table 14 includes a summary of the percent improvement in public health protection for PFOA and PFOS at several levels.

Table 14. Percent Improvement in Health Protection as Compared to EPA's HAL

PFOA		*PFOS*	
Various Levels (ng/L)	*Percent Improvement in Health Protection as Compared to EPA HAL of 70 ng/L*	*Various Levels (ng/L)*	*Percent Improvement in Health Protection as Compared to EPA HAL of 70 ng/L*
35	56%	35	63%
20	80%	20	89%
14 (MCL)	90%	18 (MCL)	93%
12	93%	16	96%
10	96%	15	98%
8 (MCLG)	100%	14 (MCLG)	100%

The percentage improvement in health protection values for PFOA and PFOS are based on an assumption that there is a linear improvement in health protection between the EPA HAL and the DPAG MCLG. The amount of improvement is set such that it totals 100% between the EPA HAL and the DPAG MCLG. The equation for calculating percent improvement in health protection is established as follows:

$$\text{Percent Improvement} = ((\text{EPA HAL} - \text{MCLG})^{-1} \times 100) \times (\text{EPA HAL} - \text{Level "X"})$$

As per the DPAG MCLG Report, PFOA has the potential to disrupt human development. The most sensitive developmental effects observed include neurobehavioral and skeletal effects. It is anticipated that these developmental effects have a measurable effect on the health of infants. The proposed MCL for PFOA of 14 ng/L would be expected to improve health protection and lower the incidence of developmental effects by 90% compared with the EPA HAL of 70 ng/L.

The DPAG MCLG Report also found that PFOS has the potential to disrupt the immune system. The effects of immune suppression are anticipated to reduce the ability to resist infections, potentially increasing the risk, duration and severity of diseases. These immune effects from PFOS have a substantial effect on the health and economy of this Commonwealth. The proposed MCL for PFOS of 18 ng/L would be expected to improve health protection and lower the incidence of immune suppression effects by 93% compared with the EPA HAL of 70 ng/L.

Compliance monitoring costs

Compliance monitoring cost estimates for this proposed rulemaking were determined based on a survey conducted of laboratories accredited in this Commonwealth for PFAS analysis by one or more of the analytical methods in this proposed rulemaking, as well as assumptions made based on an analysis of the occurrence data. According to lab survey results, the analytical cost for PFAS by either EPA Method 533, EPA Method 537 version 1.1 or EPA Method 537.1 varied greatly among the labs that responded, with a range of $325 to $750, and an average of $516, including the cost of analysis of the associated field reagent blank required by the methods for each sample site. This does not include an additional fee for sample collection, which also varied greatly among the labs offering that service; sample collection is approximately an additional $200 based on the survey.

Approximately half of the responding laboratories noted that they offer a cost reduction for reporting of fewer

analytes than included in the method, which would provide a cost savings for systems since monitoring is required for only two analytes—PFOA and PFOS. Also, a few labs noted potential savings if there are no detections in the sample; the associated field blank would be extracted, but would not need to be analyzed, which would reduce the overall cost. A few labs also noted potential additional fees for PFAS-free blank water, overnight shipping costs for samples and Level 4 data reports if requested.

For compliance monitoring cost estimates, it was assumed that approximately half of all water systems will collect their own samples and half will utilize sample collection services provided by the laboratory. Therefore, an average cost of $616 per sample was used in the following compliance monitoring cost estimate calculations.

In this proposed rulemaking, initial quarterly monitoring for community and nontransient noncommunity systems serving a population of more than 350 persons begins January 1, 2024, and initial quarterly monitoring for community and nontransient noncommunity systems serving 350 or fewer persons begins January 1, 2025. This population breakdown was selected to evenly split initial monitoring across 2 years to ease laboratory capacity issues and allow small systems more time to prepare for compliance monitoring. Initial monitoring for BVRB systems begins January 1, 2024. Based on the number of PWSs and EPs in the Pennsylvania Drinking Water Information System (PADWIS) at the time of this proposed rulemaking, there are 1,885 EPs that will begin monitoring in year 1 (2024) and 1,900 that will conduct initial monitoring in year 2 (2025).

This proposed rulemaking requires repeat compliance monitoring on a quarterly basis for any EPs at which either PFOA or PFOS is detected at a level above its respective minimum reporting limit (MRL), including those EPs at which one or both MCLs are exceeded. If the quarterly repeat monitoring results are reliably and consistently below the MCLs, the frequency of repeat monitoring may be reduced from quarterly monitoring to annual monitoring. Based on the occurrence data, it is assumed that up to 34.9% of all EPs will have a detection of PFOA or PFOS, or both, at or above the relevant MRL; this equates to 658 EPs of the year 1 initial systems that will need to continue quarterly repeat monitoring in year 2, and 663 EPs of the year 2 initial systems that will need to continue quarterly repeat monitoring in year 3. The remaining systems (1,227 EPs in year 1 and 1,237 EPs in year 2) were assumed to conduct annual repeat monitoring in each year following the initial monitoring, but this overestimates the repeat monitoring requirements and costs after the initial monitoring because, for EPs where initial monitoring results do not detect PFOA or PFOS, the frequency of repeat monitoring is reduced from annual to once every 3 years.

In addition to and separate from the performance monitoring required by permit special condition, systems with EPs that exceed one or both MCLs may require treatment, which would require the system to conduct ongoing repeat compliance monitoring at least annually. Using the noncompliance rate of 7.4% from the occurrence data (as described in section D of this preamble), a total of 280 EPs are estimated to require ongoing repeat compliance monitoring: 139 EPs from initial year 1 and 141 EPs from initial year 2. However, this is likely an overestimate because: (1) systems may have options other than installing treatment to address concentrations of PFOA or PFOS, or both, above the relevant MCL; and (2) the occurrence data sampling predominately targeted sites near potential sources of PFAS contamination, so the exceedance rate in the occurrence data may overestimate the exceedance rate for other PWSs in this Commonwealth that were not included in the occurrence data. For total compliance monitoring cost estimates, the ongoing annual compliance monitoring for EPs where treatment is installed was assumed to begin in the third year of monitoring (year 3 or year 4 overall).

Using these assumptions (which likely overestimate the compliance monitoring requirements and costs for the reasons described previously) and an estimated average cost of $616 per sample, Table 15 summarizes the overall cost estimates for compliance monitoring costs in each of the first four years of rule implementation. Note that this estimate does not include performance monitoring costs.

Table 15. Compliance Monitoring Costs

	Total # EPs	*Quarterly Initial EPs*	*Annual Repeat EPs*	*Quarterly repeat EPs*	*Quarterly compliance monitoring cost*	*Annual compliance monitoring cost*	*Total yearly compliance monitoring cost*
Year 1	1885	1885	0	0	$4,644,640	$0	$4,644,640
Year 2	1900	1900	1227	658	$6,302,579	$755,915	$7,058,495
Year 3		0	3122	663	$1,633,878	$1,923,090	$3,556,969
Year 4		0	3785	0	$0	$2,331,560	$2,331,560

Based on these estimates, the average annual monitoring costs over the first 4 years are $4,397,916. Note that this average annual compliance monitoring cost estimate of approximately $4.4 M is less than the sum of the average annual compliance monitoring cost estimates presented in section D of this preamble for PFOA ($2.9 M) and PFOS ($2.7 M). The reason for this difference in the average annual compliance monitoring cost estimates when considered for each individual contaminant (that is, PFOA and PFOS separately) compared with both contaminants together is that exceedances of the proposed PFOA and PFOS MCLs are expected to co-occur at some sites. For instance, the occurrence data showed exceedance rates of the individual proposed MCLs for PFOA and PFOS of 5.7% and 5.1%, respectively; however, the exceedance rate for the proposed MCLs accounting for co-occurring exceedances was only 7.4% (not 10.8%, the sum of the exceedance rates for the proposed MCLs considered individually). Since the laboratory analytical methods include both PFOA and PFOS, systems with exceedances of both proposed MCLs will not have to collect separate samples for PFOA and PFOS, which results in some reduction in compliance monitoring costs for these systems compared with if each contaminant is considered separately. However, because PFOA and PFOS are each associated with different health

effects and have different recommended MCLGs, the compliance monitoring cost estimates are presented separately for each contaminant in section D of this preamble to inform the cost-benefit analysis for each MCL.

Treatment costs

Treatment cost estimates were determined based on a survey conducted of systems in this Commonwealth with existing PFAS treatment and of PFAS treatment manufacturers, an American Water Works Association published PFAS Case Study, and from information provided by members of the ASDWA. Costs were provided for GAC, IX and RO. The RO costs were not included in the final cost estimates because, due to wastewater disposal requirements, the technology is currently impractical. Additionally, the costs for GAC, IX, and RO provided from the vendors were excluded from the final cost estimates because they were limited to media costs and did not include the infrastructure requirements.

GAC and IX construction costs were based on a lead lag configuration where the first vessel (lead vessel) is capable of treating the entire flow and second vessel (lag vessel) is provided for polishing.

Treatment costs were normalized to construction costs for treating 1 MGD. As shown in Table 16, the average capital cost for the GAC treatment was $3,457,110 per MGD per EP with an average annual O&M cost of $171,970 per MGD per EP.

Table 16. GAC Treatment Costs

Treatment	*System*	*Capital Cost per MGD per EP*	*Annual O&M Cost per MGD per EP*
GAC	Vendor A	$343,000 *	$32,018
GAC	Vendor B	$535,000 *	$356,000
GAC	System A (2 GAC and 1 IX)	$3,125,000	$107,007
GAC	System B, Site 1	$1,675,347	$121,528
GAC	System B, Site 2	$2,454,259	$220,820
GAC	System B, Site 3	$2,433,333	$194,444
GAC	System C	$9,250,000	unknown
GAC	System D	$3,139,000	unknown
GAC	System E	$1,135,497	unknown
GAC	System F	$4,444,444	unknown
Average cost of GAC per MGD per EP		$3,457,110	$171,970

* Not included in calculations

As shown in Table 17, the average capital cost for the IX treatment was $3,284,360 per MGD per EP with an average annual O&M cost of $155,666 per MGD per EP.

Table 17. IX Treatment Costs

Treatment	*System*	*Capital Cost per MGD per EP*	*Annual O&M Cost per MGD per EP*
IX	Vendor A	$357,000 *	$59,361 *
IX	Vendor B	$500,000 *	$175,000
IX	Vendor D	No information	$159,722
IX	System G	$10,400,000	unknown
IX	System H	$3,333,000	unknown
IX	System I	$634,900	unknown
IX	System J	$1,128,000	unknown
IX	System K	$925,900	$132,275
Average cost of IX per MGD per EP		$3,284,360	$155,666

* Not included in calculations

The average capital costs of the GAC and IX treatment is $3,370,735 per MGD per EP with an average annual O&M costs $163,818 per MGD per EP.

To estimate annual treatment costs, the average capital cost of treatment installation of $3,370,735 per MGD per EP was annualized over 20 years at a 4% interest rate. This yields an estimated annualized capital cost of $248,025 per MGD per EP.

In addition, water systems that install treatment will need to conduct performance monitoring, to verify treatment efficacy. Using the average cost per sample of $616 and assuming a total of 36 performance monitoring

samples per year—monthly samples at each of three locations (raw water, mid-point of treatment and finished water)—that is an additional annual cost of $22,176 per EP.

In the occurrence data, the percentage of EPs exceeding the proposed MCLs for PFOA and PFOS was 5.7% and 5.1%, respectively; however, due to co-occurrence of PFOA and PFOS, some EPs that exceeded the proposed MCL for PFOA also exceeded the proposed MCL for PFOS. In the occurrence data, the percentage of EPs exceeding the proposed MCL for PFOA or the proposed MCL for PFOS, or both, was 7.4%. However, this exceedance rate may overestimate the exceedance rate for the other PWSs in this Commonwealth that were not sampled, because the occurrence data sampling predominately targeted sites near potential sources of PFAS contamination. Also, as treatment for PFOA and PFOS is the same, EPs exceeding both MCLs would not be required to install two different treatment systems; therefore, the estimated percentage of EPs requiring treatment is less than the combined percentage of systems exceeding either MCL in the occurrence data. Additionally, systems with MCL exceedances may have several options to address the contamination aside from installing treatment, including taking contaminated sources offline, making operational changes such as blending sources, or using alternate sources of supply (developing new sources or using purchased sources from a new interconnect). Recognizing that the MCL exceedance rates from the occurrence data may overestimate the proportion of systems that will need to install treatment to address MCL exceedances for the aforementioned reasons, the occurrence data provides the most relevant information currently available on the prevalence and levels of PFAS in PWSs in this Commonwealth. Using the 7.4% exceedance rate from the occurrence data to estimate how many of the larger universe of 3,785 EPs may require treatment to meet one or both proposed MCLs produces an estimate of 280 EPs. At an average annualized treatment capital cost of $248,025 per MGD per EP, and assuming 280 EPs require treatment installed, the total estimated annual treatment costs are shown in Table 18.

Table 18. Total Estimated Annual Treatment Costs

Estimated average annualized treatment *capital* costs (per MGD per EP)	$248,025
Estimated average annual treatment *O&M* costs (per MGD per EP)	$163,818
Estimated average annual treatment *capital* + *O&M* costs (per MGD per EP)	$411,843
Estimated annual *performance monitoring* costs (per EP)	$22,167
Estimated # of EPs (of 3,785) that require treatment for one or both MCLs	280
Total estimated average annual treatment *capital* + *O&M* costs (per MGD)	$115,316,040
Total estimated annual *performance monitoring* costs	$6,206,760

Compliance assistance plan

The Department's Safe Drinking Water Program utilizes Pennsylvania Infrastructure Investment Authority (PENNVEST) programs to offer financial assistance to eligible PWSs. This assistance is in the form of a low-interest loan, with some augmenting grant funds for hardship cases. Eligibility is based upon factors such as public health impact, compliance necessity and project/operational affordability.

In addition to the standard funding mentioned previously, PENNVEST approved an additional funding program in 2021 under authority of the act of November 27, 2019 (P.L. 695, No. 101). The PENNVEST PFAS Remediation Program is designed as an annual funding opportunity to aid in the remediation and elimination of PFAS in PWSs. In 2021, approximately $25 million was made available for this grant program.

The Department's Safe Drinking Water Program has established a network of regional and Central Office training staff that is responsive to identifiable training needs. The target audience in need of training may be either program staff or the regulated community.

In addition to this network of training staff, the Department's Bureau of Safe Drinking Water has staff dedicated to providing both training and technical outreach support services to PWS owners and operators. The Department's web site also provides timely and useful information for treatment plant operators.

Paperwork requirements

No new forms are required for implementation of the proposed amendments.

G. *Sunset Review*

This proposed rulemaking will be reviewed in accordance with the sunset review schedule published by the Department to determine whether the regulations effectively fulfill the goals for which they were intended.

H. *Regulatory Review*

Under section 5(a) of the Regulatory Review Act (71 P.S. § 745.5(a)), on February 15, 2022, the Department submitted a copy of this proposed rulemaking and a copy of a Regulatory Analysis Form to the Independent Regulatory Review Commission (IRRC) and to the Chairpersons of the House and Senate Environmental Resources and Energy Committees. A copy of this material is available to the public upon request.

Under section 5(g) of the Regulatory Review Act, IRRC may convey any comments, recommendations or objections to this proposed rulemaking within 30 days of the close of the public comment period. The comments, recommendations or objections must specify the regulatory review criteria in section 5.2 of the Regulatory Review Act (71 P.S. § 745.5b) which have not been met. The Regulatory Review Act specifies detailed procedures for review, prior to final publication of the rulemaking, by the Department, the General Assembly, and the Governor.

I. *Public Comments*

Interested persons are invited to submit written comments, suggestions or objections regarding this proposed rulemaking to the Board. The Board is seeking comments on any aspect of this proposed rulemaking, but particularly on anticipated health benefits and on the anticipated costs to comply with the proposed MCLs, including costs to design, install, and operate treatment and other remedies. Comments, suggestions or objections must be received by the Board by April 27, 2022.

Comments may be submitted to the Board online, by e-mail, by mail or express mail as follows.

Comments may be submitted to the Board by accessing eComment at http://www.ahs.dep.pa.gov/eComment.

Comments may be submitted to the Board by e-mail at RegComments@pa.gov. A subject heading of this proposed rulemaking and a return name and address must be included in each transmission.

If an acknowledgement of comments submitted online or by e-mail is not received by the sender within 2 working days, the comments should be retransmitted to the Board to ensure receipt. Comments submitted by facsimile will not be accepted.

Written comments should be mailed to the Environmental Quality Board, P.O. Box 8477, Harrisburg, PA 17105-8477. Express mail should be sent to the Environmental Quality Board, Rachel Carson State Office Building, 16th Floor, 400 Market Street, Harrisburg, PA 17101-2301.

J. *Public Hearings*

The Board will hold five virtual public hearings for the purpose of accepting comments on this proposed rulemaking. The hearings will be held as follows:

March 21, 2022, at 1 p.m.

March 22, 2022, at 6 p.m.

March 23, 2022, at 1 p.m.

March 24, 2022, at 9 a.m.

March 25, 2022, at 9 a.m.

Persons wishing to present testimony at a hearing must contact Jennifer Swan for the Department and the Board, (717) 783-8727 or RA-EPEQB@pa.gov, by 5 p.m. on March 18, 2022 to reserve a time to present testimony. Language interpretation services are available upon request. Persons in need of language interpretation services must contact Jennifer Swan at (717) 787-4526 by 5 p.m. on March 17, 2022.

Oral testimony is limited to 5 minutes for each witness. Organizations are limited to designating one witness to present testimony on their behalf at one hearing. Witnesses may provide testimony by means of telephone or Internet connection. Video demonstrations and screen sharing by witnesses will not be permitted.

Witnesses are requested to submit written copy of their verbal testimony by e-mail to RegComments@pa.gov after providing testimony at the hearing.

Information on how to access the virtual public hearings will be available on the Board's webpage found through the Public Participation tab on the Department's web site at www.dep.pa.gov (select "Public Participation," then "Environmental Quality Board"). Prior to a hearing, individuals are encouraged to visit the Board's webpage for the most current information for accessing the hearing.

Members of the public wishing to observe a virtual public hearing without providing testimony are also directed to access the Board's webpage. Those who have not registered with Jennifer Swan in advance as described previously will remain muted for the duration of the public hearing.

Persons in need of accommodations as provided for in the Americans with Disabilities Act of 1990 should contact the Board at (717) 787-4526 or through the Pennsylvania Hamilton Relay Service at (800) 654-5984 (TDD) or (800) 654-5988 (voice users) to discuss how the Board may accommodate their needs.

PATRICK McDONNELL,
Chairperson

Fiscal Note: 7-569. No fiscal impact; (8) recommends adoption.

Annex A

TITLE 25. ENVIRONMENTAL PROTECTION

PART I. DEPARTMENT OF ENVIRONMENTAL PROTECTION

Subpart C. PROTECTION OF NATURAL RESOURCES

ARTICLE II. WATER RESOURCES

CHAPTER 109. SAFE DRINKING WATER

Subchapter A. GENERAL PROVISIONS

§ 109.1. Definitions.

The following words and terms, when used in this chapter, have the following meanings, unless the context clearly indicates otherwise:

* * * * *

Bulk water hauling system—A public water system which provides water piped into a carrier vehicle and withdrawn by a similar means into the user's storage facility or vessel. The term includes, but it not limited to, the sources of water, treatment, storage or distribution facilities. The term does not include a public water system which provides only a source of water supply for a bulk water hauling system.

***CASRN*—Chemical Abstracts Service Registry Number.**

CCR—Consumer Confidence Report—An annual water quality report that community water systems deliver to their customers, as described in § 109.416 (relating to CCR requirements).

* * * * *

Flowing stream—A course of running water flowing in a definite channel.

***GAC—Granular Activated Carbon*—A highly porous adsorbent carbon material produced by heating organic matter that can absorb various dissolved chemicals in the water.**

GAC10—A granular activated carbon filter bed with an empty bed contact time of 10 minutes based on average daily flow and a carbon reactivation frequency of every 180 days, except that the reactivation frequency for GAC10 used as a BAT shall be 120 days.

* * * * *

MCL—Maximum Contaminant Level—The maximum permissible level of a contaminant in water which is delivered to a user of a public water system, and includes the primary and secondary MCLs established under the Federal act, and MCLs adopted under the act.

MCLG—Maximum Contaminant Level Goal—

(i) The maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on the health of persons would occur, and which allows an adequate margin of safety.

(ii) The term includes the MCLGs established under the Federal act and MCLGs adopted under the act.

(iii) Maximum contaminant level goals are nonenforceable health goals.

***MDL—Method detection limit*—The minimum measured concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results.**

MRDL—Maximum Residual Disinfectant Level—The maximum permissible level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap without an unacceptable possibility of adverse health effects. The consumer's tap means the entry point for bottled water and vended water systems, retail water facilities and bulk water hauling systems.

***MRL—Minimum reporting level*—The minimum quantitation limit that can practically and consistently be achieved, with 95% confidence, by capable analysts at 75% or more of laboratories using a specified analytical method.**

Membrane filtration—

(i) A pressure or vacuum driven separation process in which particulate matter larger than 1 micrometer is rejected by an engineered barrier, primarily through a size-exclusion mechanism, and which has a measurable removal efficiency of a target organism that can be verified through the application of a direct integrity test.

(ii) The term includes the common membrane technologies of microfiltration, ultrafiltration, nanofiltration and reverse osmosis.

[*Method detection limit*—The amount of a substance which the EPA has determined to be the minimum concentration which can be measured and be reported with 99% confidence that the true value is greater than zero.]

Microorganism—Any of a number of unicellular, multicellular or colonial bacteria, fungi, protozoa, archaea or viruses whose individuals are too small to be seen by the human eye without magnification.

* * * * *

PDWEP—Guidelines for Public Drinking Water Equipment Performance issued by NSF.

***PFAS*—Perfluoroalkyl and Polyfluoroalkyl Substances.**

***PFOA*—Perfluorooctanoic acid—CASRN 335-67-1.**

***PFOS*—Perfluorooctanesulfonic acid—CASRN 1763-23-1.**

***Performance Evaluation Sample*—A reference sample provided to a laboratory for the purpose of demonstrating that the laboratory can successfully analyze the sample within the limits of performance specified by the Department. The true value of the concentration of the reference material is unknown to the laboratory at the time of the analysis.**

Person—An individual, partnership, association, company, corporation, municipality, municipal authority, political subdivision, or an agency of Federal or State government. The term includes the officers, employees and agents of a partnership, association, company, corporation, municipality, municipal authority, political subdivision, or an agency of Federal or State government.

* * * * *

Recycle flows—Any water, solid or semi-solid generated by a conventional or direct filtration plant's treatment process and residual treatment processes that is returned to the plant's treatment process.

Reliably and consistently below the MCL—

(i) For **[VOCs, SOCs, and IOCs (with the exception of nitrate and nitrite),] VOCs, SOCs, IOCs (with the exception of nitrate and nitrite), and PFAS,** this means that each sample result is less than 80% of the MCL.

(ii) For nitrate and nitrite, this means that each sample result is less than 50% of the MCL.

* * * * *

Subchapter B. MCLs, MRDLs OR TREATMENT TECHNIQUE REQUIREMENTS

§ 109.202. State MCLs, MRDLs and treatment technique requirements.

(a) *Primary MCLs, MRDLs and treatment technique requirements.*

* * * * *

(3) A public water system that is installing granular activated carbon or membrane technology to comply with the MCL for TTHMs, HAA5, chlorite (where applicable) or bromate (where applicable) may apply to the Department for an extension of up to 24 months past the applicable compliance date specified in the Federal regulations, but not beyond December 31, 2003. In granting the extension, the Department will set a schedule for compliance and may specify any interim measures that the Department deems necessary. Failure to meet the schedule or interim treatment requirements constitutes a violation of National Primary Drinking Water Regulations.

(4) Other MCLs.

(i) *Effective dates.* The MCLGs and MCLs in subparagraph (ii)(A)—(B) are effective on _____. (*Editor's Note*: The blank refers to the effective date of adoption of this proposed rulemaking when published as a final-form rulemaking.)

(ii) The MCLGs and MCLs for PFAS are:

	CASRN	*Contaminant*	*MCLG (mg/L)*	*MCL (mg/L)*	*MCLG (ng/L)*	*MCL (ng/L)*
(A)	**335-67-1**	**PFOA**	**0.000008**	**0.000014**	**8**	**14**
(B)	**1763-23-1**	**PFOS**	**0.000014**	**0.000018**	**14**	**18**

(b) *Secondary MCLs.*

* * * * *

Subchapter C. MONITORING REQUIREMENTS

§ 109.301. General monitoring requirements.

Public water suppliers shall monitor for compliance with MCLs, MRDLs and treatment technique requirements in accordance with the requirements established by the EPA under the National Primary Drinking Water Regulations, 40 CFR Part 141 (relating to National Primary Drinking Water Regulations), except as otherwise established by this chapter unless increased monitoring is required by the Department under § 109.302 (relating to special monitoring requirements). Alternative

monitoring requirements may be established by the Department and may be implemented in lieu of monitoring requirements for a particular National Primary Drinking Water Regulation if the alternative monitoring requirements are in conformance with the Federal act and regulations. The monitoring requirements shall be applied as follows:

* * * * *

(2) *Performance monitoring for unfiltered surface water and GUDI.* A public water supplier using unfiltered surface water or GUDI sources shall conduct the following source water and performance monitoring requirements on an interim basis until filtration is provided, unless increased monitoring is required by the Department under § 109.302:

(i) Except as provided under subparagraphs (ii) and (iii), a public water supplier:

(A) Shall perform *E. coli* or total coliform density determinations on samples of the source water immediately prior to disinfection. Regardless of source water turbidity, the minimum frequency of sampling for total coliform or *E. coli* determinations may be no less than the following:

System Size (People)	*Samples/Week*
<500	1
500—3,299	2
3,300—10,000	3
10,001—25,000	4
25,001 or more	5

(B) Shall measure the turbidity of a representative grab sample of the source water immediately prior to disinfection as follows until August 19, 2019:

(I) For systems that operate continuously, at least once every 4 hours that the system is in operation, except as provided in clause (C).

(II) For systems that do not operate continuously, at start-up, at least once every 4 hours that the system is in operation, and also prior to shutting down the plant, except as provided in clause (C).

(C) May substitute continuous turbidity monitoring for grab sample monitoring until August 19, 2019, if it validates the continuous measurement for accuracy on a regular basis using a procedure specified by the manufacturer. At a minimum, calibration with an EPA-approved primary standard shall be conducted at least quarterly.

(D) Shall continuously monitor and record the turbidity of the source water immediately prior to disinfection beginning August 20, 2019, using an analytical method specified in 40 CFR 141.74(a) and record the results at least every 15 minutes while the source is operating. If there is a failure in the continuous turbidity monitoring or recording equipment, or both, the supplier shall conduct grab sampling or manual recording, or both, every 4 hours in lieu of continuous monitoring or recording. The public water supplier shall notify the Department within 24 hours of the equipment failure. Grab sampling or manual recording may not be substituted for continuous monitoring for longer than 5 working days after the equipment fails. The Department will consider case-by-case extensions of the time frame to comply if the water supplier provides written documentation that it was unable to repair or replace the malfunctioning equipment within 5 working days due to circumstances beyond its control.

(E) Shall continuously monitor and record the residual disinfectant concentration required under § 109.202(c)(1)(iii) of the water being supplied to the distribution system and record the lowest value for each day. If a public water system's continuous monitoring or recording equipment fails, the public water supplier may, upon notification of the Department under § 109.701(a)(3), substitute grab sampling or manual recording, or both, every 4 hours in lieu of continuous monitoring. Grab sampling or manual recording may not be substituted for continuous monitoring for longer than 5 days after the equipment fails.

(F) Until April 28, 2019, shall measure the residual disinfectant concentration at representative points in the distribution system no less frequently than the frequency required for total coliform sampling for compliance with the MCL for microbiological contaminants.

(G) Beginning April 29, 2019, shall measure and record the residual disinfectant concentration at representative points in the distribution system in accordance with a sample siting plan as specified in § 109.701(a)(8) and as follows:

(I) A public water supplier shall monitor the residual disinfectant concentration at the same time and from the same location that a total coliform sample is collected as specified in paragraph (3)(i) and (ii). Measurements taken under this subclause may be used to meet the requirements under subclause (II).

(II) A public water supplier shall monitor the residual disinfectant concentration at representative locations in the distribution system at least once per week.

(III) A public water supplier that does not maintain the minimum residual disinfectant concentration specified in § 109.710 at one or more sample sites shall include those sample sites in the monitoring conducted the following month.

(IV) Compliance with the minimum residual disinfectant concentration shall be determined in accordance with § 109.710.

(V) A public water system may substitute online residual disinfectant concentration monitoring and recording for grab sample monitoring and manual recording if it validates the online measurement for accuracy in accordance with § 109.304.

(ii) Until August 19, 2019, for a public water supplier serving 3,300 or fewer people, the Department may reduce the residual disinfectant concentration monitoring for the water being supplied to the distribution system to a minimum of 2 hours between samples at the grab sampling frequencies prescribed as follows if the historical performance and operation of the system indicate the system can meet the residual disinfectant concentration at all times:

System Size (People)	*Samples/Week*
<500	1
500—1,000	2
1,001—2,500	3
2,501—3,300	4

If the Department reduces the monitoring, the supplier shall nevertheless collect and analyze another residual disinfectant measurement as soon as possible, but no

longer than 4 hours from any measurement which is less than the residual disinfectant concentration approved under § 109.202(c)(1)(iii).

(iii) Until August 19, 2019, for a public water supplier serving fewer than 500 people, the Department may reduce the source water turbidity monitoring to one grab sample per day, if the historical performance and operation of the system indicate effective disinfection is maintained under the range of conditions expected to occur in the system's source water.

(*Editor's Note*: The bracketed text as follows to be deleted is duplicated due to a previous printing error. The text of these serial pages can be found at (393259) and (391315) to (391317).)

[(iv) A public water supplier providing conventional filtration treatment or direct filtration and serving 10,000 or more people and using surface water or GUDI sources shall, beginning January 1, 2002, conduct continuous monitoring of turbidity for each individual filter using an approved method under the EPA regulation in 40 CFR 141.74(a) (relating to analytical and monitoring requirements) and record the results at least every 15 minutes. Beginning January 1, 2005, public water suppliers providing conventional or direct filtration and serving fewer than 10,000 people and using surface water or GUDI sources shall conduct continuous monitoring of turbidity for each individual filter using an approved method under the EPA regulation in 40 CFR 141.74(a) and record the results at least every 15 minutes.

(A) The water supplier shall calibrate turbidimeters using the procedure specified by the manufacturer. At a minimum, calibration with an EPA-approved primary standard shall be conducted at least quarterly.

(B) If there is failure in the continuous turbidity monitoring or recording equipment, or both, the system shall conduct grab sampling or manual recording, or both, every 4 hours in lieu of continuous monitoring or recording.

(C) A public water supplier serving 10,000 or more persons has a maximum of 5 working days following the failure of the equipment to repair or replace the equipment before a violation is incurred.

(D) A public water supplier serving fewer than 10,000 persons has a maximum of 14 days following the failure of the equipment to repair or replace the equipment before a violation is incurred.

(v) A public water supplier shall calculate the log inactivation of Giardia, using measurement methods established by the EPA, at least once per day during expected peak hourly flow. The log inactivation for Giardia must also be calculated whenever the residual disinfectant concentration at the entry point falls below the minimum value specified in § 109.202(c) (relating to State MCLs, MRDLs and treatment technique requirements) and continue to be calculated every 4 hours until the residual disinfectant concentration at the entry point is at or above the minimum value specified in § 109.202(c). Records of log inactivation calculations must be reported to the Department in accordance with § 109.701(a)(2).

(vi) In addition to the requirements specified in subparagraph (v), a public water supplier that uses a disinfectant other than chlorine to achieve log inactivation shall calculate the log inactivation of viruses at least once per day during expected peak hourly flow. The log inactivation for viruses shall also be calculated whenever the residual disinfectant concentration at the entry point falls below the minimum value specified in § 109.202(c) and continue to be calculated every 4 hours until the residual disinfectant concentration at the entry point is at or above the minimum value specified in § 109.202(c). Records of log inactivation calculations shall be reported to the Department in accordance with § 109.701(a).

(2) *Performance monitoring for unfiltered surface water and GUDI.* A public water supplier using unfiltered surface water or GUDI sources shall conduct the following source water and performance monitoring requirements on an interim basis until filtration is provided, unless increased monitoring is required by the Department under § 109.302:

(i) Except as provided under subparagraphs (ii) and (iii), a public water supplier:

(A) Shall perform *E. coli* or total coliform density determinations on samples of the source water immediately prior to disinfection. Regardless of source water turbidity, the minimum frequency of sampling for total coliform or *E. coli* determinations may be no less than the following:

System Size (People)	*Samples/Week*
<500	1
500—3,299	2
3,300—10,000	3
10,001—25,000	4
25,001 or more	5

(B) Shall measure the turbidity of a representative grab sample of the source water immediately prior to disinfection as follows until August 19, 2019:

(I) For systems that operate continuously, at least once every 4 hours that the system is in operation, except as provided in clause (C).

(II) For systems that do not operate continuously, at start-up, at least once every 4 hours that the system is in operation, and also prior to shutting down the plant, except as provided in clause (C).

(C) May substitute continuous turbidity monitoring for grab sample monitoring until August 19, 2019, if it validates the continuous measurement for accuracy on a regular basis using a procedure specified by the manufacturer. At a minimum, calibration with an EPA-approved primary standard shall be conducted at least quarterly.

(D) Shall continuously monitor and record the turbidity of the source water immediately prior to disinfection beginning August 20, 2019, using an analytical method specified in 40 CFR 141.74(a) and record the results at least every 15 minutes while the source is operating. If there is a failure in the continuous turbidity monitoring or recording equipment, or both, the supplier shall conduct grab sampling or manual recording, or both, every 4 hours in lieu of continuous monitoring or record-

ing. The public water supplier shall notify the Department within 24 hours of the equipment failure. Grab sampling or manual recording may not be substituted for continuous monitoring for longer than 5 working days after the equipment fails. The Department will consider case-by-case extensions of the time frame to comply if the water supplier provides written documentation that it was unable to repair or replace the malfunctioning equipment within 5 working days due to circumstances beyond its control.

(E) Shall continuously monitor and record the residual disinfectant concentration required under § 109.202(c)(1)(iii) of the water being supplied to the distribution system and record the lowest value for each day. If a public water system's continuous monitoring or recording equipment fails, the public water supplier may, upon notification of the Department under § 109.701(a)(3), substitute grab sampling or manual recording, or both, every 4 hours in lieu of continuous monitoring. Grab sampling or manual recording may not be substituted for continuous monitoring for longer than 5 days after the equipment fails.

(F) Until April 28, 2019, shall measure the residual disinfectant concentration at representative points in the distribution system no less frequently than the frequency required for total coliform sampling for compliance with the MCL for microbiological contaminants.

(G) Beginning April 29, 2019, shall measure and record the residual disinfectant concentration at representative points in the distribution system in accordance with a sample siting plan as specified in § 109.701(a)(8) and as follows:

(I) A public water supplier shall monitor the residual disinfectant concentration at the same time and from the same location that a total coliform sample is collected as specified in paragraph (3)(i) and (ii). Measurements taken under this subclause may be used to meet the requirements under subclause (II).

(II) A public water supplier shall monitor the residual disinfectant concentration at representative locations in the distribution system at least once per week.

(III) A public water supplier that does not maintain the minimum residual disinfectant concentration specified in § 109.710 at one or more sample sites shall include those sample sites in the monitoring conducted the following month.

(IV) Compliance with the minimum residual disinfectant concentration shall be determined in accordance with § 109.710.

(V) A public water system may substitute online residual disinfectant concentration monitoring and recording for grab sample monitoring and manual recording if it validates the online measurement for accuracy in accordance with § 109.304.

(ii) Until August 19, 2019, for a public water supplier serving 3,300 or fewer people, the Department may reduce the residual disinfectant concentration monitoring for the water being supplied to the distribution system to a minimum of 2 hours between samples at the grab sampling frequencies prescribed as follows if the historical performance and operation of the system indicate the system can meet the residual disinfectant concentration at all times:

System Size (People)	*Samples/Week*
<500	**1**
500—1,000	**2**
1,001—2,500	**3**
2,501—3,300	**4**

If the Department reduces the monitoring, the supplier shall nevertheless collect and analyze another residual disinfectant measurement as soon as possible, but no longer than 4 hours from any measurement which is less than the residual disinfectant concentration approved under § 109.202(c)(1)(iii).

(iii) Until August 19, 2019, for a public water supplier serving fewer than 500 people, the Department may reduce the source water turbidity monitoring to one grab sample per day, if the historical performance and operation of the system indicate effective disinfection is maintained under the range of conditions expected to occur in the system's source water.]

(3) *Monitoring requirements for coliforms.* Public water systems shall determine the presence or absence of total coliforms for each routine or check sample; and, the presence or absence of *E. coli* for a total coliform positive sample in accordance with analytical techniques approved by the Department under § 109.304 (relating to analytical requirements). A system may forego *E. coli* testing on a total coliform-positive sample if the system assumes that any total coliform-positive sample is also *E. coli*-positive. A system which chooses to forego *E. coli* testing shall, under § 109.701(a)(3), notify the Department within 1 hour after the water system learns of the violation or the situation, and shall provide public notice in accordance with § 109.408 (relating to Tier 1 public notice—categories, timing and delivery of notice) if there is a violation of the *E. coli* MCL as set forth in subparagraph (iv).

* * * * *

(6) *Monitoring requirements for SOCs (pesticides and PCBs).* Community water systems and nontransient noncommunity water systems shall monitor for compliance with the MCLs for SOCs established by the EPA under 40 CFR 141.61(c). The monitoring shall be conducted according to the requirements established by the EPA under 40 CFR 141.24(h), incorporated herein by reference except as modified by this chapter.

* * * * *

(vii) *Waivers.* A waiver will be granted to a public water supplier from conducting the initial compliance monitoring or repeat monitoring, or both, for an SOC based on documentation provided by the public water supplier and a determination by the Department that the criteria in clause (B), (C) or (D) has been met. A waiver is effective for one compliance period and may be renewed in each subsequent compliance period. If the Department has not granted a use waiver in accordance with clause (B), the public water supplier is responsible for submitting a waiver application and renewal application to the Department for review in accordance with clause (B), (C) or (D) for specific entry points. Waiver applications will be evaluated relative to the vulnerability assessment area described in clause (A) and the criteria in clause (B), (C) or (D). Entry points at which treatment has been in-

stalled to remove an SOC are not eligible for a monitoring waiver for the SOCs for which treatment has been installed.

(A) *Vulnerability assessment area for SOCs including dioxin and PCBs.*

(I) For groundwater or GUDI entry points, the vulnerability assessment area shall consist of wellhead protection area Zones I and II **as defined under § 109.1 (relating to definitions)**.

(II) For surface water entry points, the vulnerability assessment area shall consist of **[the area that supplies water to the entry point and is separated from other watersheds by the highest topographic contour] surface water intake protection area Zones A and B as defined under § 109.1**.

(B) *Use waivers.* A use waiver will be granted by the Department for contaminants which the Department has determined have not been used, stored, manufactured, transported or disposed of in this Commonwealth, or portions of this Commonwealth. A use waiver specific to a particular entry point requires that an SOC was not used, stored, manufactured, transported or disposed of in the vulnerability assessment area. If use waiver criteria cannot be met, a public water supplier may apply for a susceptibility waiver.

* * * * *

(8) *Monitoring requirements for public water systems that obtain finished water from another public water system.*

* * * * *

(iii) Consecutive water suppliers may be exempt from conducting monitoring for the MCLs for **[VOCs, SOCs and IOCs and radionuclides] VOCs, SOCs, IOCs, radionuclides and PFAS** if the public water system from which the finished water is obtained complies with paragraphs **[(5)—(7) and (14)] (5)—(7), (14) and (16)** and is in compliance with the MCLs, except that asbestos monitoring is required in accordance with subparagraph (ii).

* * * * *

(9) *Monitoring requirements for POE devices.* A public water supplier using a POE device shall, in addition to the monitoring requirements specified in paragraphs (1)—(8)**, (10)—(16) and Subchapter K (relating to lead and copper)**, conduct monitoring on the devices installed. As a minimum, the monitoring shall include the MCLs for which the POE device is intended to treat and monthly microbiological monitoring. The Department may allow the water supplier to reduce the frequency of microbiological monitoring based upon historical performance. Except for microbiological contaminants, monitoring shall be performed quarterly on 25% of the installed POE devices with the locations rotated so that each device is monitored at least once annually, unless increased monitoring is required by the Department under § 109.302.

* * * * *

(11) *Monitoring requirements for entry points that do not provide water continuously.* Entry points from which water is not provided during every quarter of the year shall monitor in accordance with paragraphs **[(5)—(7) and (14)] (5)—(7), (14) and (16)**, except that monitoring is not required during a quarter when water is not provided to the public, unless special monitoring is required by the Department under § 109.302.

* * * * *

(15) *Monitoring requirements for reserve entry points and entry points supplied by one or more reserve sources.* Beginning August 20, 2019, a water supplier using reserve sources or reserve entry points as defined and identified in the comprehensive monitoring plan in § 109.718(a) (relating to comprehensive monitoring plan) shall:

(i) Monitor reserve entry points at the initial frequencies specified in paragraphs **[(5)—(7) and (14)] (5)—(7), (14) and (16)**.

(ii) Monitor permanent entry points at the initial frequencies specified in paragraphs **[(5)—(7) and (14)] (5)—(7), (14) and (16)** while the entry point is receiving water from a reserve source.

(iii) Conduct special monitoring as required by the Department under § 109.302.

(16) *Monitoring requirements for PFAS.* Community water systems and nontransient noncommunity water systems shall monitor for compliance with the MCLs for PFAS established under § 109.202(a).

(i) *Initial monitoring.* Initial monitoring shall consist of 4 consecutive quarterly samples at each entry point in accordance with the following monitoring schedule:

(A) Systems serving more than 350 persons shall begin monitoring for the PFAS listed in § 109.202(a)(4)(ii)(A) and (B) during the quarter beginning January 1, 2024.

(B) Systems serving 350 or fewer persons shall begin monitoring for the PFAS listed in § 109.202(a)(4)(ii)(A) and (B) during the quarter beginning January 1, 2025.

(C) Systems that add new sources to new or existing entry points on or after the applicable dates in clauses (A) and (B), shall conduct initial monitoring according to this clause. An entry point with one or more new sources shall be monitored for 4 consecutive quarters, beginning the first full quarter the entry point begins serving the public.

(ii) *Repeat monitoring for entry points at which at least one of the PFAS with an MCL is detected.* For entry points at which at least one of the PFAS with an MCL established under § 109.202(a) is detected at a level equal to or greater than its corresponding MRL as defined in § 109.304(f), then:

(A) Monitoring for compliance with the MCLs for PFAS established under § 109.202(a) shall be repeated quarterly, beginning the quarter following the detection, until reduced monitoring is granted in accordance with this subparagraph.

(B) The Department may decrease the quarterly monitoring requirement specified in clause (A) if it has determined that monitoring results are reliably and consistently below all MCLs for PFAS established under § 109.202(a). The Department will not make this determination until the water system obtains results from a minimum of four consecutive quarterly samples that are reliably and consistently below all PFAS MCLs.

(C) If the Department determines that monitoring results are reliably and consistently below all PFAS MCLs, the Department may allow the system to monitor annually. Systems which monitor annually shall monitor for compliance with the MCLs for PFAS established under § 109.202(a) during the quarter that previously yielded the highest analytical result, or as specified by the Department.

(iii) *Repeat monitoring at entry points at which none of the PFAS are detected.* For entry points at which none of the PFAS with an MCL established under § 109.202(a) are detected during initial monitoring in accordance with subparagraph (i), required monitoring is reduced to one sample per entry point during each subsequent compliance period. This reduced monitoring shall be conducted in the same year as reduced monitoring granted for VOCs under paragraph (5)(iv)(B) and SOCs under paragraph (6)(iii) as specified by the Department.

(iv) *Repeat monitoring for entry points at which at least one of the PFAS exceeds an MCL.* For entry points at which a result for at least one of the PFAS exceeds an MCL established under § 109.202(a), monitoring for compliance with the MCLs for PFAS established under § 109.202(a) shall be conducted quarterly, beginning the quarter following the exceedance. Quarterly monitoring shall continue until a minimum of four consecutive quarterly samples shows the system is in compliance as specified in subparagraph (ix) and the Department determines the system is reliably and consistently below all PFAS MCLs. If the Department determines that the system is in compliance and is reliably and consistently below all PFAS MCLs, the Department may allow the system to monitor in accordance with subparagraph (ii)(C).

(v) *Confirmation samples.* A confirmation sample shall be collected and analyzed for each of the PFAS detected in exceedance of its MCL during annual or less frequent compliance monitoring. The confirmation sample shall be collected within 2 weeks of notification from the accredited laboratory performing the analysis that an MCL has been exceeded.

(vi) *Repeat and performance monitoring for entry points with PFAS removal treatment.* The reduced monitoring option in subparagraph (iii) does not apply to entry points at which treatment has been installed for removal of at least one of the PFAS with an MCL established under § 109.202(a). Compliance monitoring shall be conducted at least annually at entry points with PFAS treatment. Performance monitoring shall be conducted quarterly for the specific PFAS for which treatment is provided.

(vii) *Waivers.* Systems conducting monitoring under subparagraph (ii) at groundwater or GUDI entry points may apply for a use waiver for those entry points which have 3 consecutive years of quarterly or annual samples with no detection of any of the PFAS with an MCL established under § 109.202(a). A use waiver from conducting monitoring under subparagraph (ii)(C) may be granted to a public water supplier with groundwater or GUDI entry points based on documentation provided by the public water supplier and a determination by the Department that the requirements in clauses (A) and (B) have been met. Entry points at which treatment has been installed to remove one or more of the PFAS with MCLs established under § 109.202(a) are not eligible for a waiver.

(A) A use waiver may be granted for a specific entry point after evaluating knowledge of previous use, including storage, manufacturing, transport or disposal of one or more PFAS within the wellhead protection area Zones I and II as defined under § 109.1. If a determination by the Department reveals no previous use, a waiver may be granted for the entry point.

(B) Waiver requests and renewals shall be submitted to the Department, on forms provided by the Department, for review and approval prior to the end of the applicable monitoring period. Until the waiver request or renewal is approved, the public water system is responsible for conducting all required monitoring.

(C) If a use waiver is granted by the Department, required monitoring at that entry point is reduced to one sample during the subsequent compliance period. This monitoring shall be conducted during the quarter that previously yielded the highest analytical result, or as specified by the Department, and in the same years as any reduced monitoring granted for VOCs under paragraph (5)(iv)(B) and SOCs under paragraph (6)(iii) as specified by the Department.

(D) A waiver is effective for one compliance period and may be renewed in each subsequent compliance period.

(viii) *Invalidation of PFAS samples.*

(A) The Department may invalidate results of obvious sampling errors.

(B) A sample invalidated under this subparagraph does not count towards meeting the minimum monitoring requirements of this paragraph.

(ix) *Compliance determinations.* Compliance with the PFAS MCLs shall be determined based on the analytical results obtained at each entry point. If one entry point is in violation of an MCL, the system is in violation of the MCL.

(A) For systems monitoring more than once per year, compliance with the MCL is determined by a running annual average of all samples taken at each entry point.

(B) If monitoring is conducted annually or less frequently, the system is out of compliance if the level of a contaminant at any entry point is greater than the MCL. If a confirmation sample is collected as specified in subparagraph (v), compliance is determined using the average of the two sample results.

(C) If any sample result will cause the running annual average to exceed the MCL at any entry point, the system is out of compliance with the MCL immediately.

(D) If a system fails to collect the required number of samples, compliance with the MCL will be based on the total number of samples collected.

(E) If a sample result is less than the MRL, zero will be used to calculate compliance.

§ 109.303. Sampling requirements.

(a) The samples taken to determine a public water system's compliance with MCLs, MRDLs or treatment technique requirements or to determine compliance with monitoring requirements shall be taken at the locations identified in §§ 109.301, 109.302, 109.1003, 109.1103, 109.1202 and 109.1303 and as follows:

* * * * *

(4) Samples for determining compliance with MCLs for organic contaminants listed by the EPA under 40 CFR 141.61 (relating to maximum contaminant levels for organic contaminants), inorganic contaminants listed by the EPA under 40 CFR 141.62 (relating to maximum contaminant levels (MCLs) for inorganic contaminants), radionuclide contaminants listed by the EPA under 40 CFR 141.66 (relating to maximum contaminant levels for radionuclides) **[and with the special monitoring requirements for unregulated contaminants under § 109.302(f) (relating to special monitoring requirements)]** shall be taken at each entry point to the distribution system which is representative of each source after an application of treatment during periods of normal operating conditions. If a system draws water from more than one source and the sources are combined prior to distribution, the system shall sample at the entry point during periods of normal operating conditions when water is representative of all sources being used.

(5) Asbestos sampling points shall be at the distribution tap where asbestos contamination is expected to be the greatest based on the presence of asbestos cement pipe and lack of optimum corrosion control treatment, and at the entry point for each source which the Department has reason to believe may contain asbestos, except that a collected distribution sample which is representative of a source may be substituted for a required entry point sample.

(6) Samples for determining compliance with MCLs for PFAS contaminants listed in § 109.202(a)(4) shall be taken as follows:

(i) Samples shall be collected at each entry point to the distribution system which is representative of each source after an application of treatment during periods of normal operating conditions. If a system draws water from more than one source and the sources are combined prior to distribution, the system shall sample at the entry point during periods of normal operating conditions when water is representative of all sources being used.

(ii) Samples shall be collected by a person properly trained by a laboratory accredited by the Department to conduct PFAS analysis.

(b) The samples taken to determine a public water system's compliance with treatment technique and performance monitoring requirements shall be taken at a point that is as close as practicable to each treatment technique process and that is not influenced by subsequent treatment processes or appurtenances.

* * * * *

§ 109.304. Analytical requirements.

(a) Sampling and analysis shall be performed in accordance with analytical techniques adopted by the EPA under the Federal act or methods approved by the Department.

* * * * *

(e) A water supplier shall calibrate all turbidimeters used for compliance monitoring using the procedure specified by the manufacturer. At a minimum, calibration with an EPA-approved primary standard shall be conducted at least every 90 days. The Department may extend this 90-day calibration frequency if the calibration due date coincides with a holiday or weekend, or during a water system emergency which prevents timely calibration.

(f) For the purpose of determining compliance with the PFAS MCLs established in § 109.202(a)(4) (relating to State MCLs, MRDLs and treatment technique requirements), sampling and analysis for PFAS shall be conducted as follows:

(1) Sampling and analysis shall be according to the following approved methods and MRLs:

Contaminant	*Methods*	*MRL (ng/L)*
(i) PFOA	EPA 533, EPA 537.1, EPA 537 Version 1.1	5
(ii) PFOS	EPA 533, EPA 537.1, EPA 537 Version 1.1	5

(2) Analysis shall be conducted by a laboratory accredited by the Department.

(3) Accredited laboratories must determine the MDL for each analyte, according to the procedure in Appendix B, Revision 2 to 40 CFR Part 136 (relating to definition and procedure for the determination of the method detection limit) or as specified in the method.

(4) Accredited laboratories must analyze Performance Evaluation Samples provided by a third party at least once per year by each method for which the laboratory maintains certification. Results of Performance Evaluation Samples must be within ±30% of the true value.

(5) The MRL must be contained within the range of calibration.

Subchapter D. PUBLIC NOTIFICATION

§ 109.411. Content of a public notice.

(a) *Elements of a public notice.* When a public water system is required to give public notice under this subchapter, each public notice must include the following elements:

* * * * *

(e) *Standard language for a public notice.* Public water systems shall include the following standard language in their public notice:

(1) *Standard health effects language for primary MCL or MRDL violations, treatment technique violations, and violations of the condition of a variance or exemption.* Public water systems shall include in each public notice appropriate health effects language. This subchapter incorporates by reference the health effects language specified in 40 CFR Part 141, Subpart Q, Appendix B (relating to standard health effects language for public notification), corresponding to each primary MCL, MRDL and treatment technique violation listed in 40 CFR Part 141, Subpart Q, Appendix A (relating to NPDWR violations and other situations requiring public notice), and for each violation of a condition of a variance or exemption, unless other health effects language is established by regulations or order of the Department. **[The health effects lan-**

guage for fluoride is not incorporated by reference. Public water systems shall include the following health effects language in each Tier 2 public notice for violation of the primary MCL of 2 mg/L for fluoride:]

(i) The health effects language for fluoride is not incorporated by reference. Public water systems shall include the following health effects language in each Tier 2 public notice for violation of the primary MCL of 2 mg/L for fluoride:

"This is an alert about your drinking water and a cosmetic dental problem that might affect children under nine years of age. At low levels, fluoride can help prevent cavities, but children drinking water containing more than 2 milligrams per liter (mg/L) of fluoride may develop cosmetic discoloration of their permanent teeth (dental fluorosis). Dental fluorosis, in its moderate or severe forms, may result in a brown staining and or pitting of the permanent teeth. This problem occurs only in developing teeth, before they erupt from the gums. Drinking water containing more than 4 mg/L of fluoride (the U.S. Environmental Protection Agency's drinking water standard) can increase your risk of developing bone disease."

(ii) Public water systems shall include the following health effects language in each Tier 2 public notice for violation of the primary MCL for PFOA:

"Drinking water containing PFOA in excess of the MCL of 14 ng/L may cause adverse health effects, including developmental effects (neurobehavioral and skeletal effects)."

(iii) Public water systems shall include the following health effects language in each Tier 2 public notice for violation of the primary MCL for PFOS:

"Drinking water containing PFOS in excess of the MCL of 18 ng/L may cause adverse health effects, including decreased immune response."

(2) *Standard language for violations of monitoring requirements.* Public water systems shall include the following language in their notice, including the language necessary to fill in the blanks, for all violations of monitoring requirements listed in 40 CFR Part 141, Subpart Q, Appendix A:

* * * * *

§ 109.416. CCR requirements.

This section applies only to community water systems and establishes the minimum requirements for the content of the annual CCR that each system shall deliver to its customers. This report must contain information on the quality of the water delivered by the system and characterize the risks, if any, from exposure to contaminants detected in the drinking water in an accurate and understandable manner.

* * * * *

(3) Except as noted in subparagraphs (i)—(v), the annual report that a community water system provides to its customers shall contain all of the information, mandatory language and optional text specified by the EPA under 40 CFR 141.153 and 141.154 (relating to content of the reports; and required additional health information), which are incorporated by reference, and under 40 CFR 141, Subpart O, Appendix A (relating to regulated contaminants), which is incorporated by reference, unless other information, mandatory language or optional text is established by regulations or order of the Department. The health effects language for fluoride is not incorporated by reference. Public water systems shall include the health effects language specified in § **[109.411(d)(1)]** **109.411(e)(1)(i)** (relating to content of a public notice) for violation of the primary MCL of 2 mg/L fluoride.

(i) If a water system wants to use wording of its own choice in place of optional text, the water supplier shall submit the proposed wording to the Department for review and written approval prior to including it in its annual CCR. Once approved, the water supplier's wording may be used in future CCRs without further approval from the Department as long as it is not changed and is still applicable.

(ii) The CCR shall contain information in Spanish regarding the importance of the report or contain a telephone number or address where persons served may contact the water system to obtain a translated copy of the report or to request assistance.

(iii) For each non-English-speaking group other than Spanish-speaking that exceeds 10% of the residents for systems serving at least 1,000 people or 100 residents for systems serving less than 1,000 people, and speaks the same language other than English, the report shall contain information in the appropriate languages regarding the importance of the report or contain a telephone number or address where persons served may contact the water system to obtain a translated copy of the report or to request assistance in the appropriate language. The Department will make the final determination of which systems need to include this information.

(iv) For the purpose of defining how certain portions of a CCR shall appear, the term "prominently display" as used in 40 CFR 141.154(a) means that the information shall be printed either in a larger size typeface or bolded or enclosed within a border or all these so as to make the information conspicuous in comparison to the rest of the text appearing before and after the prominently displayed text. Prominently displayed text placed away from other text (such as, in a highlighted or boxed area) shall be printed no smaller than the text used elsewhere in the body of the report, excluding main or section titles.

(v) Information contained in a CCR shall appear in an easy-to-read format. Font sizes below 10 points or color combinations, or both, that make it difficult for persons to read and understand the information contained in the CCR may not be used.

(3.1) Public water suppliers required to conduct monitoring for PFAS under § 109.301(16) (relating to monitoring requirements) shall also include at a minimum the following information:

(i) Information on results detected.

(A) MCL in ng/L.

(B) MCLG in ng/L.

(C) Highest level detected in ng/L.

(D) Range of detections in ng/L.

(E) Sample dates.

(F) Whether a violation occurred.

(G) *Sources of contamination.* The likely sources of detected contaminants to the best of the public water supplier's knowledge. Specific information regarding contaminants may be available in sanitary surveys or source water assessments and should be used when available. If the public water supplier lacks specific information on the likely source or sources of the contaminant or contaminants, the following statement shall be used:

"Discharge from manufacturing facilities and runoff from land use activities."

(ii) *Health effects language.* Public water systems shall include the health effects language specified in § 109.411(e)(1)(ii) and (iii) for violation of a primary MCL for PFAS specified in § 109.202(a) (relating to State MCLs, MRDLs and treatment technique requirements).

(4) Each community water system shall do the following:

(i) Mail or otherwise directly deliver to each customer one copy of the annual CCR no later than the date specified in paragraph (2).

(ii) Mail a paper copy of the annual CCR to the Department no later than the date the water system is required to distribute the CCR to its customers.

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Subchapter E. PERMIT REQUIREMENTS

§ 109.503. Public water system construction permits.

(a) *Permit application requirements.* An application for a public water system construction permit shall be submitted in writing on forms provided by the Department and shall be accompanied by plans, specifications, engineer's report, water quality analyses and other data, information or documentation reasonably necessary to enable the Department to determine compliance with the act and this chapter. The Department will make available to the applicant the Public Water Supply Manual, available from the Bureau of Safe Drinking Water, Post Office Box 8467, Harrisburg, Pennsylvania 17105 which contains acceptable design standards and technical guidance. Water quality analyses shall be conducted by a laboratory accredited under this chapter.

(1) *General requirements.* An application must include:

* * * * *

(iii) *Information describing new sources.* Information describing new sources must include the items specified in clauses (A)—(F). The information specified in clauses (C) and (D) may not be more than 2 years old from the date the permit application is submitted unless the Department approves the use of data more than 2 years old. The Department may accept approval of an out-of-State source by the agency having jurisdiction over drinking water in that state if the supplier submits adequate proof of the approval and the agency's standards are at least as stringent as this chapter:

* * * * *

(D) An evaluation of the quality of the raw water from each new source. For groundwater sources, the evaluation shall be conducted at the conclusion of the constant rate aquifer test. This clause does not apply when the new source is finished water obtained from an existing permitted community water system unless the Department provides written notice that an evaluation is required. The evaluation must include analysis of all of the following:

* * * * *

(XIV) For groundwater sources, the monitoring specified in § 109.302(f) (relating to special monitoring requirements) if the Department determines that the source is susceptible to surface water influence.

(XIV.1) PFAS for which MCLs have been established under § 109.202(a) (relating to State MCLs, MRDLs and treatment technique requirements).

(XV) Other contaminants that the Department determines necessary to evaluate the potability of the source.

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Subchapter F. DESIGN AND CONSTRUCTION STANDARDS

§ 109.602. Acceptable design.

(a) A public water system shall be designed to provide an adequate and reliable quantity and quality of water to the public. The design must ensure that the system will, upon completion, be capable of providing water that complies with the primary and secondary MCLs, MRDLs and treatment techniques established in Subchapters B, K, L and M except as further provided in this section.

* * * * *

(i) Alarm and shutdown capabilities must conform to all of the following:

* * * * *

(3) Be capable of notifying the available operator on duty of events triggering an alarm or plant shutdown.

(j) *PFAS.*

(1) The Department identifies the following treatment technologies as acceptable for achieving compliance with the MCLs for PFAS, established under § 109.202(a) (relating to State MCLs, MRDLs and treatment technique requirements):

(i) GAC.

(ii) Ion exchange.

(iii) Reverse Osmosis.

(2) Other treatment technologies may be approved by the Department if the applicant demonstrates the alternate technology is capable of providing an adequate and reliable quantity and quality of water to the public.

Subchapter G. SYSTEM MANAGEMENT RESPONSIBILITIES

§ 109.701. Reporting and recordkeeping.

(a) *Reporting requirements for public water systems.* Public water systems shall comply with the following requirements:

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(3) *One-hour reporting requirements.* A public water supplier shall report the circumstances to the Department within 1 hour of discovery for the following violations or situations:

(i) A primary MCL or an MRDL has been exceeded or a treatment technique requirement has been violated under Subchapter B, K, L or M.

(ii) A sample result requires the collection of check **or confirmation** samples under § 109.301.

(iii) Circumstances exist which may adversely affect the quality or quantity of drinking water including, but not limited to:

* * * * *

Subchapter J. BOTTLED WATER AND VENDED WATER SYSTEMS, RETAIL WATER FACILITIES AND BULK WATER HAULING SYSTEMS

§ 109.1003. Monitoring requirements.

(a) *General monitoring requirements.* Bottled water and vended water systems, retail water facilities and bulk water hauling systems shall monitor for compliance with

the MCLs, MRDLs and treatment techniques as follows, except that systems which have installed treatment to comply with a primary MCL shall conduct quarterly operational monitoring for the contaminant which the treatment is designed to remove:

(1) Bottled water systems, retail water facilities and bulk water hauling systems, for each entry point shall:

* * * * *

(xiv) Beginning April 28, 2018, a system that uses or obtains finished water from another permitted public water system using surface water or GUDI sources shall comply with the following requirements:

* * * * *

(C) When the requirements of clause (A) or (B) cannot be achieved, the supplier shall initiate an investigation under the Department's direction to determine the cause, potential health risks and appropriate remedial measures.

(xv) Beginning January 1, 2024, monitor for compliance with the MCLs for PFAS established under § 109.202(a).

(A) ***Monitoring exemption.*** **Systems that obtain finished water from another permitted public water system are exempt from conducting monitoring for PFAS if the public water system supplying the finished water performs the required monitoring at least annually and a copy of the analytical reports are received by the Department.**

(B) ***Initial monitoring.*** **Initial monitoring shall consist of 4 consecutive quarterly samples at each entry point. Systems that add new sources to new or existing entry points on or after January 1, 2024 shall conduct initial monitoring according to this clause. An entry point with one or more new sources shall be monitored for 4 consecutive quarters, beginning the first full quarter the entry point begins serving the public.**

(C) ***Repeat monitoring.*** **Repeat monitoring for entry points shall be conducted as follows:**

(I) For an entry point at which at least one of the PFAS with an MCL established under § 109.202(a) is detected during initial monitoring or where one or more PFAS is detected anytime at a level in excess of its MCL, compliance monitoring shall be repeated quarterly for the PFAS for which an MCL has been established under § 109.202(a). After analyses of four consecutive quarterly samples at an entry point, including initial quarterly monitoring samples, demonstrate that the PFAS levels in each quarterly sample are less than the MCLs, the required compliance monitoring is reduced to one sample per year at that entry point for all PFAS for which an MCL has been established under § 109.202(a).

(II) For a groundwater or surface water entry point at which no PFAS for which an MCL has been established under § 109.202(a) are detected during the initial and subsequent repeat monitoring, repeat monitoring shall be one sample per year from that entry point.

(D) ***Confirmation samples.*** **A confirmation sample shall be collected and analyzed for each of the PFAS detected in exceedance of its MCL during annual monitoring. The confirmation sample shall be collected within 2 weeks of notification from the accredited laboratory performing the analysis of the MCL exceedance.**

(E) ***Repeat and performance monitoring for entry points with PFAS removal treatment.*** **Compliance monitoring shall be conducted annually at entry points with PFAS treatment. Performance monitoring shall be conducted quarterly for the specific PFAS for which treatment is provided.**

(F) ***Invalidation of PFAS samples.***

(I) **The Department may invalidate results of obvious sampling errors.**

(II) A sample invalidated under this clause does not count towards meeting the minimum monitoring requirements of this subparagraph.

(G) ***Compliance determinations.*** **Compliance with the PFAS MCLs shall be determined based on the analytical results obtained at each entry point. If one entry point is in violation of an MCL, the system is in violation of the MCL.**

(I) For systems monitoring more than once per year, compliance with the MCL is determined by a running annual average of all samples taken at each entry point.

(II) If monitoring is conducted annually, the system is out of compliance if the level of a contaminant at any entry point is greater than the MCL. If a confirmation sample is collected as specified in clause (D), compliance is determined using the average of the two sample results.

(III) If any sample result will cause the running annual average to exceed the MCL at any entry point, the system is out of compliance with the MCL immediately.

(IV) If a system fails to collect the required number of samples, compliance with the MCL will be based on the total number of samples collected.

(V) If a sample result is less than the MRL, zero will be used to calculate compliance.

(2) Vended water systems shall monitor in accordance with paragraph (1) except that vended water systems qualifying for permit by rule under § 109.1005(b), for each entry point shall:

* * * * *

(b) *Sampling requirements.*

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(3) Sampling and analysis shall be performed in accordance with analytical techniques adopted by the EPA under the Federal act or methods approved by the Department **in accordance with § 109.304.**

(4) Compliance monitoring samples for VOCs, as required under subsection (a)(1)(iii), shall be collected by a person properly trained by a laboratory certified by the Department to conduct VOC or vinyl chloride analysis.

* * * * *

(6) **[Sampling and analysis shall be performed in accordance with analytical techniques adopted by the EPA under the Federal act or methods approved by the Department.] Compliance monitoring samples for PFAS, as required under subsection (a)(1)(xv), shall be collected by a person properly trained by a laboratory accredited by the Department to conduct PFAS analysis.**

(c) *Repeat monitoring for microbiological contaminants.*

* * * * *

Subchapter N. DRINKING WATER FEES

§ 109.1403. Monitoring waiver fees.

(a) *New waivers.* An application for a new waiver from the monitoring requirements in §§ 109.301 and 109.302 (relating to general monitoring requirements; and special monitoring requirements) for a single source must be accompanied by a fee as follows:

Waiver Type	*New Waiver Fee*
VOC use waiver	$100
SOC use waiver	$100
SOC susceptibility waiver	$300
IOC waiver	$100
PFAS use waiver	**$100**

(b) *Waiver renewals.* An application for a waiver renewal from the monitoring requirements in §§ 109.301 and 109.302 for a single source must be accompanied by the appropriate fee as follows:

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