Regulatory Analysis Form

(Completed by Promulgating Agency)

(All Comments submitted on this regulation will appear on IRRC's website)

INDEPENDENT REGULATORY REVIEW COMMISSION

(1) Agency:

Department of Environmental Protection

(2) Agency Number: 7

Identification Number: 569

IRRC Number**: 3334**

(3) PA Code Cite: 25 Pa. Code, Chapter 109 (Safe Drinking Water)

(4) Short Title: Safe Drinking Water PFAS MCL Rule

(5) Agency Contacts (List Telephone Number and Email Address):

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(6) Type of Rulemaking (check applicable box):

- ☐ Proposed Regulation
- ☒ Final Regulation
- ☐ Final Omitted Regulation
- ☐ Emergency Certification Regulation;
- ☐ Certification by the Governor
- ☐ Certification by the Attorney General

(7) Briefly explain the regulation in clear and nontechnical language. (100 words or less)

This rulemaking sets drinking water standards for two chemicals – perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) – which are part of a larger group of perfluoroalkyl and polyfluoroalkyl substances (PFAS). The rulemaking also describes monitoring requirements for public water systems (PWSs) to demonstrate compliance with the PFOA and PFOS standards. Currently, these contaminants are not regulated in drinking water at the federal level or in Pennsylvania. Implementation of the drinking water standards in this rulemaking will protect Pennsylvanians from the adverse health effects of these contaminants.

The rulemaking also includes minor revisions to address incorrect cross-references and citations, delete duplicated text, and update language; these minor updates codify existing practices and will not change current practice.

(8) State the statutory authority for the regulation. Include specific statutory citation.

Section 4 of the Pennsylvania Safe Drinking Water Act, 35 P.S. § 721.4, and section 1920-A of The Administrative Code of 1929, 71 P.S. § 510-20.

(9) Is the regulation mandated by any federal or state law or court order, or federal regulation? Are there any relevant state or federal court decisions? If yes, cite the specific law, case or regulation as well as, any deadlines for action.

The rule is not federally mandated.

In 2016, the United States Environmental Protection Agency (EPA) established a lifetime health advisory level (HAL) for PFOA and PFOS of 70 parts per trillion (ppt) combined. HALs are not enforceable standards, but the Department has the regulatory authority to require corrective actions by PWSs if HALs are exceeded, as well as having the statutory authority to set state maximum contaminant levels (MCLs) in drinking water. Current research indicates that the 2016 EPA HAL is not sufficiently protective of public health. On February 22, 2021, EPA issued final regulatory determinations for contaminants on the fourth Contaminant Candidate List, which included a final determination to regulate PFOA and PFOS in drinking water. This determination was published in the *Federal Register* on March 3, 2021 (86 FR 12272), which starts a 24-month time clock for EPA to publish a proposed rulemaking. In the meantime, one of the goals of the PFAS Action Team in Pennsylvania, created by Executive Order 2018-08 signed in September 2018 by Governor Wolf, is the establishment of a state MCL in drinking water. Until EPA publishes a final rulemaking for PFOA and PFOS, a state drinking water standard is needed to improve public health protection for the nearly 12 million Pennsylvanians served by the PWSs to which this final-form rulemaking applies.

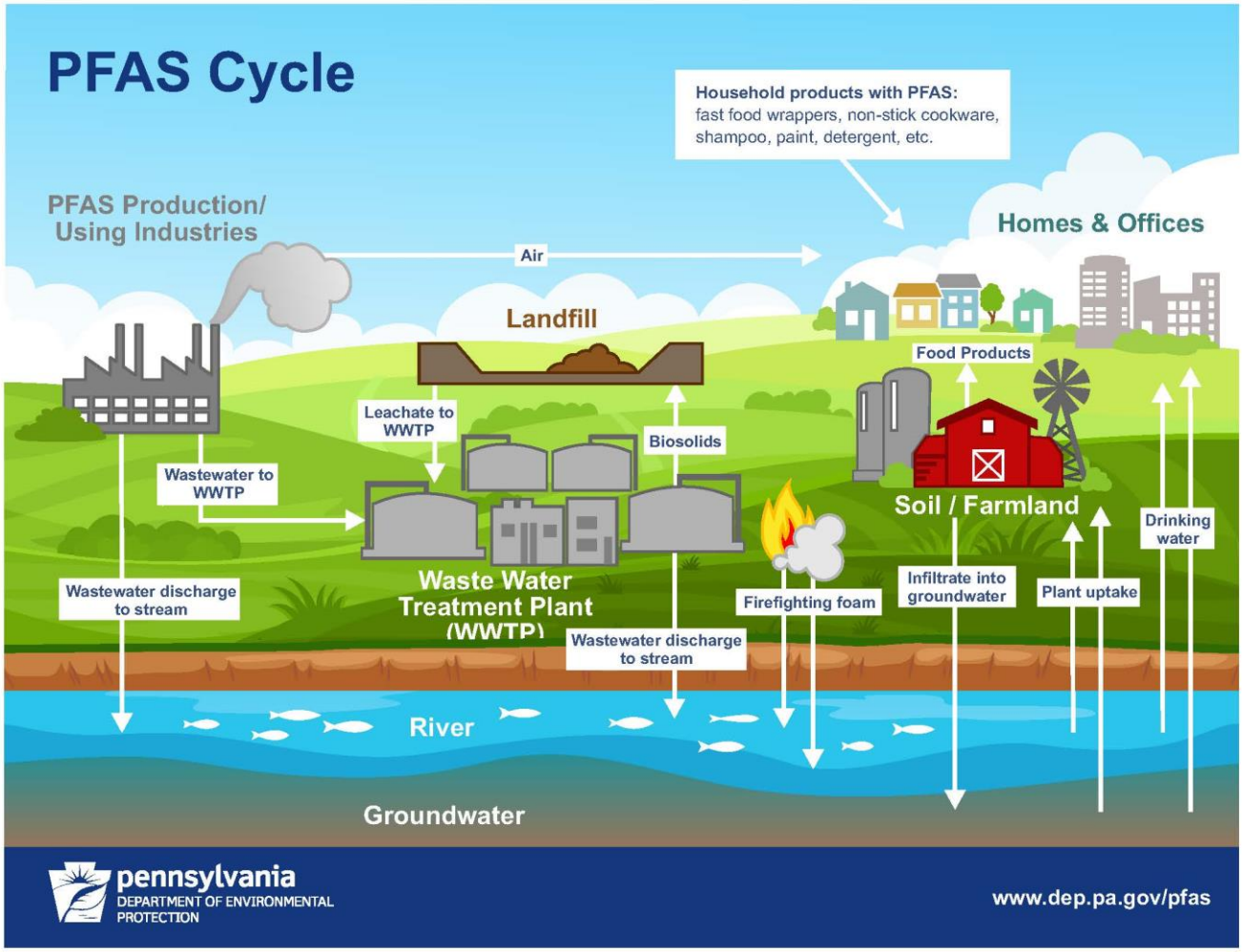
(10) State why the regulation is needed. Explain the compelling public interest that justifies the regulation. Describe who will benefit from the regulation. Quantify the benefits as completely as possible and approximate the number of people who will benefit.

This rule is needed to better protect Pennsylvanians from the adverse health effects of exposure to PFOA and PFOS in drinking water.

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. As illustrated below, PFAS remain in the environment and cycle through various media (i.e., 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.

The PFAS cycle and its exposure pathways.



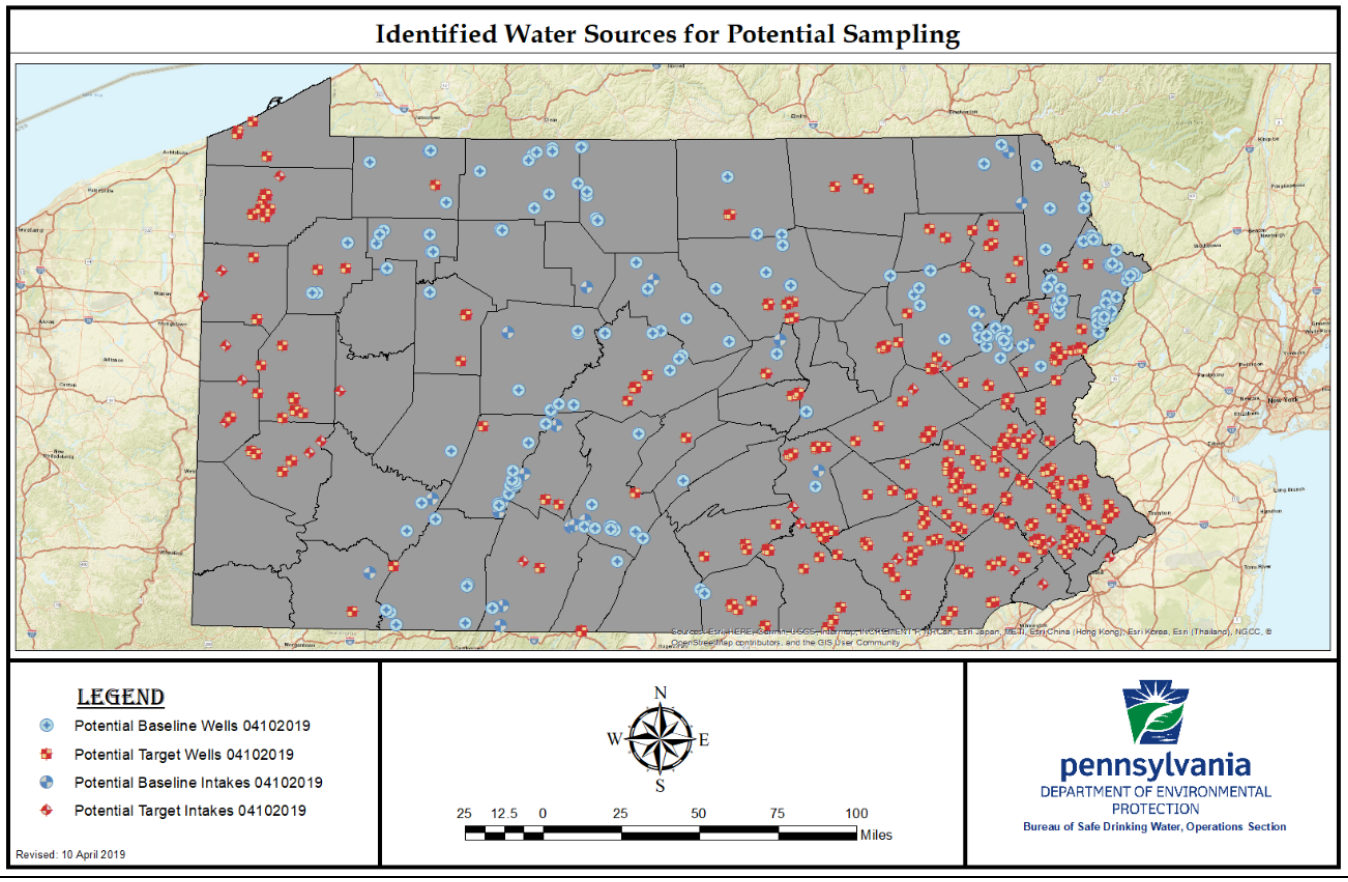
Through a toxicology services contract, a group of toxicologists and other scientific professionals at Drexel University – referred to here as the Drexel PFAS Advisory Group (DPAG) – determined that PFOA exposure has been linked to developmental effects (neurobehavioral and skeletal effects) and PFOS exposure has been linked to adverse immune system effects (including immune suppression); specific references used by DPAG in this research are cited in the DPAG report and workbook, links to which are provided in the response to question 28.

In 2016, EPA established a combined lifetime HAL for PFOA and PFOS of 70 ppt in finished drinking water. While HALs are not enforceable regulatory standards, the Department has the regulatory authority to require corrective actions if HALs are exceeded. However, current research suggests that the 2016 EPA HAL for PFOA and PFOS is not sufficiently protective of public health. EPA has started the process of setting more stringent standards for PFOA and PFOS in drinking water, but that process is expected to take several 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 the nearly 12 million Pennsylvanians served by the PWSs to which this rule applies. This rule will improve public health protection by requiring PWSs to comply with a lower standard for PFOA and PFOS in drinking water and to routinely monitor the drinking water they provide to ensure compliance with those lower standards.

The Department contracted DPAG to review current health-based studies and research on select PFAS. Based on this research, DPAG made maximum contaminant level goal (MCLG) recommendations to the Department for select PFAS. MCLGs are non-enforceable levels based solely on health effects and do not take into consideration other factors such as technical limitations or cost. Based on MCLGs recommended by DPAG, the Department determined MCLs for PFOA and PFOS in part by assessing the percentage of improvement in health protection at various levels, including the recommended MCLGs, compared to the 2016 EPA HAL. Compared to the 2016 EPA HAL, the MCL of 14 ppt for PFOA represents a 90% increase in public health protection and the MCL of 18 ppt for PFOS represents a 93% increase in health protection. This increase in public health protection is expected to result from a reduction in instances of human development disruption and immune system impacts.

Occurrence data for PFAS were also used in development of this rulemaking. The Department's Bureau of Safe Drinking Water (BSDW) collected data as part of BSDW's sampling plan for PFAS in drinking water supplies. The below map identifies the PWS sources for potential sampling, including the targeted and baseline sites. Targeted sites were selected based on their proximity to potential sources of PFAS contamination (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 five miles from a PSOC. Ultimately, samples were collected from 412 EPs, including 372 targeted sites and 40 baseline sites. Note that an EP to a distribution system may include water from more than one source of supply.

PFAS Sampling Plan – Pool of Identified PWS Sources for Potential Sampling.



The Department also conducted a review of sample results from monitoring conducted by PWS in Pennsylvania under EPA's Third Unregulated Contaminant Monitoring Rule (UCMR3). The UCMR3 data includes results analyzed for six PFAS via EPA Method 537 Version 1.1. The samples collected as part of BSDW's sampling plan were analyzed for 18 PFAS via EPA Method 537.1. In the occurrence data, PFOA was detected in 29.9% of samples and PFOS was detected in 27.1% of samples. The occurrence data were also compared to the MCLGs and MCLs. For PFOA, 10.6% of results were over the MCLG of 8 ppt and 5.7% of results were over the MCL of 14 ppt. For PFOS, 5.3% of results were over the MCLG of 14 ppt and 5.1% of results were over the MCL of 18 ppt. These data indicate that implementing a lower standard for PFOA and PFOS than the 2016 EPA HAL represents a meaningful opportunity to improve public health protection in Pennsylvania.

This rulemaking applies to all 3,117 community, nontransient noncommunity, bottled, vended, retail, and bulk PWSs in Pennsylvania. Of these, 1,905 are community water systems (CWSs), serving a combined population of approximately 11.4 million Pennsylvanians; another 1,096 are nontransient noncommunity water systems (NTNCWSs) serving approximately 507,000 persons. Therefore, the rulemaking benefits approximately 11.9 million Pennsylvanians.

(11) Are there any provisions that are more stringent than federal standards? If yes, identify the specific provisions and the compelling Pennsylvania interest that demands stronger regulations.

Yes, the provisions in this rulemaking are more stringent than current federal standards. EPA has not set MCLs for PFOA or PFOS, and the MCLs for PFOA and PFOS in this rulemaking are more stringent than the 2016 HAL established by EPA. Since PFOA and PFOS in drinking water are not currently regulated at the federal level, the monitoring frequencies and other provisions in this rulemaking are also more stringent than any federal requirements. The Department developed these provisions to better protect public health in Pennsylvania, in accordance with the goals of Pennsylvania's PFAS Action Team.

- The MCLGs in this rulemaking at § 109.202(a)(4)(ii) are based on the most current toxicological research available at the time. Through a toxicology services contract, DPAG conducted a thorough and independent review of federal and other states' work on MCLs for PFAS, including the available research, data, and scientific studies. Based on this research, DPAG mad MCLG recommendations to the Department for select PFAS. MCLGs are non-enforceable levels based solely on health effects and do not take into consideration other factors such as technical limitations or cost. MCLGs are the starting point for determining MCLs.

- The MCLs in this rulemaking at § 109.202(a)(4)(ii) were determined based on a variety of factors, including DPAG's MCLG recommendations and review of available health effects information, occurrence data, a cost-benefit analysis, and technical considerations such as analytical methods and available treatment techniques. The cost-benefit analysis evaluated the percentage of improvement in health protection relative to the percentage of increased cost of implementation at various levels compared to the 2016 EPA HAL. The MCLs determined based on this process represent a 90% and 93% improvement in health protection for PFOA and PFOS, respectively. This is a significant increase in public health protection and a compelling reason to move forward with more stringent standards than federal requirements. DPAG's review of PFAS blood serum levels at various PFAS concentrations in drinking water correlate well with the Department's assessment of at least 90% improvement in public health at the MCLs (DPAG, 2022).

- The monitoring requirements for CWSs, NTNCWSs, and bottled, vended, retail, and bulk systems (BVRBs) for PFOA and PFOS in this rulemaking at § 109.301(16) and § 109.1003(a)(1)(xv) are necessary to demonstrate compliance with the MCLs. Monitoring requirements include initial quarterly monitoring, reduced repeat monitoring where there are no detections, quarterly repeat monitoring where there is a detection or an MCL exceedance, confirmation samples to confirm an MCL exceedance, and monitoring requirements for systems with treatment to remove PFAS, to ensure treatment efficacy.

- This rulemaking also establishes MCL exceedances for PFOA and PFOS as chronic health-based violations requiring Tier 2 public notification (PN) and includes health effects language at § 109.411(e)(1)(ii) and (iii) to include in notices for MCL exceedances of PFOA or PFOS. Public notification of any MCL exceedance is a critical component of public health protection.

(12) How does this regulation compare with those of the other states? How will this affect Pennsylvania's ability to compete with other states?

At the time of this final-form rulemaking, seven other states – Massachusetts, Michigan, New Hampshire, New Jersey, New York, Vermont, and Washington – have enacted regulations on PFAS in drinking water. A few other states – including California, Connecticut, Minnesota, and Ohio – have implemented advisory, guidance, or response levels for PFAS in drinking water. Table 1 below summarizes other states' regulatory limits, applicability, PN requirements, best available technology (BAT) or acceptable treatment, and analytical methods and minimum reporting levels (MRLs) and compares them to the provisions of this rule. Monitoring requirements are summarized for comparison in Table 2.

Table 1. Comparison of state MCLs, applicability, PN requirements, BAT, and analytical methods for PFAS

State	PFOA MCL (ppt)	PFOS MCL (ppt)	Other PFAS MCLs (ppt)	Applicability	PN	BAT or Acceptable Treatment	Analytical Methods/MRL
PA	14	18	NA (monitoring and reporting required for 5 additional PFAS during initial quarterly monitoring only)	CWSs, NTNCWSs, BVRBs	Tier 2	GAC, ion exchange, reverse osmosis (RO), or other technologies approved by DEP	EPA 537 version 1.1, EPA 537.1, EPA 533; MRL = 5 ppt
MA	20 (sum of six PFAS: PFOA, PFOS, PFHxS, PFNA, PFHpA, PFDA)			CWSs & NTNCWSs (TNCs must conduct 1 round of monitoring)	Tier 2; Note: MCL exceedance triggers delivery of public education materials.	GAC, PAC, ion exchange resins, nanofiltration, and RO	EPA 537, EPA 537.1; MRL=2.0 ppt; Note: rule requires analysis and reporting of all PFAS in method
MI	8	16	HFPO-DA=370 PFBS=420 PFHxS=51 PFHxA=400,000 PFNA=6	CWSs & NTNCWSs (TNCs may be required to monitor)	Tier 2	GAC or an equally efficient technology	EPA 537.1 or other methods approved; MRL=2 ppt

NH	12	15	PFHxS=18 PFNA=11	CWSs & NTNCWSs	No PN Tier assignment	Not specified in rule; summary indicates compliance achieved using GAC	Methods not specified; Detection limit = 2 ppt
NJ	14	13	PFNA=13	CWSs & NTNCWSs	No PN Tier assignment	Not specified in rule	Methods not specified; recommended PQL values are 6 ppt for PFOA and 4.2 ppt for PFOS
NY	10	10	NA	CWSs & NTNCWSs	Tier 2	GAC	
VT	20 (sum of five PFAS: PFOA, PFOS, PFHxS, PFHpA, PFNA)			CWSs & NTNCWSs	Tier 1, Do Not Drink		EPA 537.1 or subsequent EPA-approved method; MRL = 2 ppt
WA	10	15	PFNA=9 PFHxS=65 PFBS=345	CWSs & NTNCWSs	Tier 2	Not specified in rule	EPA 537.1, EPA 533 MRL not specified
CA	5.1	6.5		Notification Levels			
	10	40		Response Levels			
CT	16	10	PFNA = 12 PFHxS = 49	Action Level			
MN	35	15	PFBS = 100 PFHxS = 47 PFBA = 7,000 PFHxA = 200	Health Advisory Levels			
OH	70 (alone or combined with PFOS)	70 (alone or combined with PFOA)	HFPO-DA=21 PFBS=2,100 PFHxS=140 PFNA=21	HALs for PFOA and PFOS; all other PFAS listed have Action Levels			

Table 2. Comparison of state monitoring requirements for PFAS

State	Monitoring
PA	Initial: 4 Quarterly (Q) samples Repeat: If detected at or above minimum reporting level (MRL), continue Q for at least 4 Q and until reliably and consistently (R&C) < MCL. If R&C < MCL, DEP may allow system to monitor annually (A) during previously highest quarter. If detected > MCL, continue Q for at least 4 Q and until R&C <MCL. If R&C <MCL, DEP may allow A monitoring during previous highest quarter. Reduced: If not detected (ND), monitor every 3 years. Waivers: Systems with previous detections <MCL may apply for a use waiver to reduce from A to triennial monitoring. Notes: Confirmation sample required within 2 weeks of notice from lab of result > MCL. Entry points (EPs) with treatment monitor for compliance at least A, performance monitoring Q.

MA	Initial: 4 Q samples Routine: If ND, monitor every 3 years (small systems: 1 Q sample, medium/large systems: 2 Q samples) Increased: If detect > 10 ppt (50% of MCL), monitor monthly. If detect < 10 ppt, or R&C < 10, monitor A. If ND for 3 A periods, monitor every 3 years. Waivers: PWS on routine monitoring can request waiver for 3-year period which must be renewed; monitoring must be conducted at least once during first 3-year period of each 9-year cycle. Waivers are combination use and susceptibility. Notes: During initial monitoring, PWS can request to substitute previous Q data. If ND in first 2 Qs, PWS can request waiver for Qs 3 & 4. EPs w/treatment monitor Q. Detects require confirmation sample within 2 weeks and source water monitoring.
MI	Initial: If PWS participated in MI's Statewide PFAS Survey and results were >50% of MCL, PWS shall collect Q samples; if results were <50% of MCL, PWS shall collect one sample within 6 months. If PWS did not participate in Statewide Survey, PWS shall collect Q samples. Reduced: If ND, PWS may monitor A. If detects, monitor Q until results are R&C below MCL. If R&C below MCL, PWS may monitor A. Waivers: No waivers.
NH	Initial: 4 Q samples. If first 2 Qs ND, final 2 Qs can be waived. Reduced: If average of initial results is </=50% of MCL, monitor once every 3 years. If average of initial results is >50% of MCL, monitor A. Monitor during Q with highest result. Confirmation sample required within 14 days if result >50% of MCL. Increased: If running annual average (RAA) > MCL, monitor Q. If PWS installs treatment, monitor Q. Waivers: No waivers.
NJ	Requires monitoring as per EPA VOC requirements (141.24(f)). Includes initial Q monitoring. Rule allows substitution (grandfathering) of select existing data to fulfill initial Q monitoring requirement. Rule does not mention waivers.
NY	Initial: 4 Q samples. Repeat: Continue Q if detected. Reduced: State can reduce Q to A if R&C below MCL. After 3 A periods w/no detect, can apply for waiver. If detects, repeat monitoring must include all PFAS contained in method. If ND, sample every 18 months (medium /large systems >3,300) or every 3 years (small systems <3,300). Waivers: Rule allows 3-year use waivers.
VT	Initial: A monitoring. Reduced: If ND, monitor every 3 years. If ND for 2 consecutive triennial periods, monitor every 6 years. Increased: If detected <15 ppt, stay on A. If detected >15 ppt, conduct Q monitoring. If <15ppt for 4 Qs, monitor A.
WA	Initial: One sample prior to December 31, 2025 Reduced: If ND, one sample every 3 years. Repeat: If detected, 1 or 2 additional quarterly samples if level detected < 80% of regulatory limit (then reduced to A); quarterly if level detected is >= 80% of regulatory limit.

Other states not identified in the preceding tables did not have state MCLs or other regulatory limits for PFAS established as of the time of this final-form rulemaking. Those states have the 2016 EPA lifetime HAL of 70 ppt combined for PFOA and PFOS to use as a guidance value, until such time that EPA or the individual state publishes a final rule setting MCLs and monitoring requirements for PFOA and PFOS.

By improving public health protections for nearly 12 million Pennsylvania, this rule will enhance Pennsylvania's ability to compete with other states. This rulemaking is not expected to negatively affect Pennsylvania's ability to compete with other states for at least two reasons. First, the MCLs for PFOA and PFOS in this rulemaking are of similar magnitude as MCLs for PFOA, PFOS, and other PFAS established by other states (see Table 1), and the monitoring requirements in this rulemaking are similar to those established by other states (see Table 2). Second, states that have not established state-level drinking water standards for PFAS would be required to adopt federal MCLs set by EPA.

(13) Will the regulation affect any other regulations of the promulgating agency or other state agencies? If yes, explain and provide specific citations.

The amendments will be incorporated into the existing language of 25 Pa. Code Chapter 109. Other than this incorporation, the amendments should not affect any existing or currently proposed regulations of the Department or any other state agency.

(14) Describe the communications with and solicitation of input from the public, any advisory council/group, small businesses and groups representing small businesses in the development and drafting of the regulation. List the specific persons and/or groups who were involved. ("Small business" is defined in Section 3 of the Regulatory Review Act, Act 76 of 2012.)

The Public Water System Technical Assistance Center (TAC) Board is the Department's primary advisory board for the Department's Safe Drinking Water Program. The TAC Board includes representatives from a broad array of drinking water professional associations and stakeholder organizations.

The Department presented the draft proposed rulemaking to the TAC Board for review and discussion on July 29, 2021; the TAC Board unanimously supported the draft proposed rulemaking as it was presented. The TAC Board also expressed support for the draft proposed rulemaking in a letter dated July 30, 2021, available at https://files.dep.state.pa.us/PublicParticipation/Public%20Participation%20Center/PubPartCenterPortalFiles/Environmental%20Quality%20Board/2021/November%2016/03_7-569_PFAS%20MCL_Proposed%20RM/04b_7-569_PFAS%20MCL_Proposed_TAC%20Comment%20letter.pdf.

The Department presented the draft final-form rulemaking to the TAC Board on July 14, 2022; the TAC Board unanimously supported the draft final-form rulemaking as it was presented. The TAC Board also expressed support for the draft final-form rulemaking in a letter dated July 18, 2022 (copy attached).

(15) Identify the types and number of persons, businesses, small businesses (as defined in Section 3 of the Regulatory Review Act, Act 76 of 2012) and organizations which will be affected by the regulation. How are they affected?

This rulemaking applies to all 3,117 community, nontransient noncommunity, bottled, vended, retail, and bulk PWSs in Pennsylvania. Of these, 1,905 are CWSs, serving a combined population of approximately 11.4 million Pennsylvanians; another 1,096 are NTNCWSs serving approximately 507,000 persons.

A review of the federal Small Business Size Regulations at 13 CFR Part 121 provides a standard for determining what constitutes a small business for the North American Industry Classification System (NAICS) category relating to PWSs. A PWS falls within NAICS category 221310, Water Supply and Irrigation Systems, which comprises establishments primarily engaged in operating water treatment plants and/or operating water supply systems. The federal small size standard for this NAICS category is annual receipts of not more than $27.5 million.

The Pennsylvania Safe Drinking Water Act and Chapter 109 regulations do not contain any requirements for the submission of financial records. As such, the Department has no way to estimate annual receipts of PWSs. The Department and EPA have historically classified system size based on the

number of persons served by a water system. The National Primary Drinking Water Regulations at 40 CFR § 141.2 define three drinking water system size classifications: small systems, serving 3,300 persons or fewer; medium systems, serving 3,301 to 50,000 persons; and large systems, serving more than 50,000 persons.

For purposes of identifying small businesses affected by this rulemaking, the Department used the federal definition of a small water system in 40 CFR § 141.2 (i.e., a water system that serves 3,300 persons or fewer), and applied that definition to any PWS owned by a private individual or investor.

Of the 3,117 PWSs for which this rulemaking is applicable, 1,519 are privately owned or investor-owned and can be considered as a small business; 887 of these are CWSs and 632 are NTNCWSs.

Of the 3,117 PWSs covered by the rulemaking, at least 2,898 would be required to monitor for compliance with the MCLs by sampling for PFOA and PFOS for four consecutive quarters in either the first or second year of implementation. CWSs and NTNCWSs serving more than 350 persons would monitor in the first year and CWSs and NTNCWSs serving 350 or fewer persons would monitor during the second year; BVRBs would all conduct initial monitoring in the first year of implementation. The remaining 219 PWSs are consecutive systems that purchase finished water from another PWS and would not be required to conduct monitoring unless the selling system fails to monitor as required. Those PWSs that detect PFOA or PFOS during the initial monitoring period would be required to perform additional monitoring. Those PWSs whose monitoring results exceed the PFOA MCL and/or the PFOS MCL would have several options for addressing the contamination including taking contaminated sources offline, making operational changes such as blending sources, using alternate sources of supply (developing new sources or using purchased sources from a new interconnect), or adding treatment. A more detailed discussion of how the regulated community will be affected is included in the response to question 17.

The persons and communities served by these systems benefit from increased public health protection and avoidance of health effects from consuming water containing PFOS and PFOA at levels above the MCLs. As detailed in the response to question 19 below, complying with this rule will result in some cost increases to PWSs, which may be passed on to the customers they serve.

(16) List the persons, groups or entities, including small businesses, that will be required to comply with the regulation. Approximate the number that will be required to comply.

All 3,117 CWS, NTNCWS, and BVRB systems in Pennsylvania are required to comply with this regulation. However, 219 of these systems are consecutive systems (i.e., purchasing finished water from another PWS) and would not be required to conduct monitoring unless the selling system fails to monitor as required. Consecutive systems would not be required to install treatment unless monitoring indicates PFAS levels within their system exceed a PFAS MCL.

As noted in the response to question 15, of the 3,117 systems required to comply with this rule, 1,519 are considered small businesses. However, 23 of these small systems are consecutive systems and would not be required to conduct monitoring. The remaining 1,496 small systems that are considered small businesses would be required to conduct monitoring and install treatment if results indicate levels are above the MCLs.

(17) Identify the financial, economic and social impact of the regulation on individuals, small businesses, businesses and labor communities and other public and private organizations. Evaluate the benefits expected as a result of the regulation.

The expected benefits of this rule are the avoidance of adverse health effects from the consumption of drinking water contaminated with PFOA and PFOS, including chronic illnesses, as well as the cost savings expected from prevention of those illnesses. Improved health benefits expected to result from implementation of the rule include a reduction in instances of developmental effects (including neurobehavioral and skeletal effects) and decreased immune response. More detailed information on the benefits expected as a result of this rulemaking are provided in the response to question 18.

This regulation provides a positive economic impact to individuals, small businesses, and businesses that provide services to the drinking water industry for sample collection and laboratory analysis, and design, construction, and operation and maintenance of water treatment technology.

The rule is intended to reduce the public health risks and associated costs related to consumption of drinking water contaminated with PFAS. Compared to the current 2016 EPA HAL for PFOA and PFOS of 70 ppt combined, the MCL for PFOA is expected to result in a 90% improvement in public health protection, and the MCL for PFOS is expected to result in a 93% improvement in public health protection.

There are 3,117 PWSs affected by this rule, including 2,648 small water systems (population served ≤ 3,300 persons); of those, 1,519 are privately owned or investor-owned and, therefore, considered small businesses. Complying with this rule will result in increased costs for additional monitoring by affected PWSs and increased treatment or other operational modification costs for those PWSs where monitoring shows MCL exceedances. While it is possible that some of these costs may be passed on to PWS customers, it is not possible to estimate the costs to individual ratepayers for several reasons. First, the specific water systems that will need to address elevated PFAS levels have not all been identified yet and will be determined by the initial monitoring required by this final-form rulemaking. Once these systems are identified, there are several other factors that affect if and how drinking water rates may change, including the following: not all water systems are regulated by the Pennsylvania Public Utility Commission, so rate-setting requirements vary widely; some water systems may be able to absorb some of the costs or have the ability to spread the costs over a larger ratepayer base; the eligibility of funding for treatment is based on ranking criteria that incorporate multiple factors; and each water system has unique, site-specific considerations (such as the type and age of equipment, the ability to take a source offline or blend with other sources, the availability of alternate sources, etc.) that will influence whether treatment or other measures are the appropriate corrective action.

Additional monitoring

This rulemaking specifies monitoring for PFAS at each EP. Since most small systems have only one EP, the monitoring cost estimates for small systems assumes one EP per system. The cost of the additional monitoring these systems are expected to incur from this rulemaking is estimated at $516 per sample, with an additional potential cost of approximately $200 for sample collection services provided by a laboratory. During the quarterly initial monitoring specified in this rulemaking, this represents an annual cost of approximately $2,064 to $2,864 per EP. This estimate is based on a survey conducted by the Department of Pennsylvania-accredited laboratories for PFAS analysis and represents an average analytical cost of laboratories that responded to the survey, including the cost of the associated field reagent blank.

This rulemaking specifies that the monitoring requirements following the initial monitoring year are determined by results of the initial monitoring. If PFOA or PFOS is detected at a level that is reliably and consistently below the MCL, the rulemaking specifies that monitoring continue annually at an average annual cost of $516 to $716 per EP. If neither PFOA nor PFOS are detected in the initial monitoring, the rulemaking specifies that monitoring may be reduced to one sample every three years. If PFOA or PFOS or both exceeds the relevant MCL during initial monitoring, quarterly compliance monitoring continues until results demonstrate levels are reliably and consistently below the MCLs, or until additional corrective actions are needed. If PFAS removal treatment is ultimately installed to comply with the MCLs, annual monitoring would include, at a minimum, annual compliance monitoring and quarterly performance monitoring, for a total annual cost of $2,580 to $3,580 per EP.

In addition to sample collection by the water system – as opposed to the water system paying a laboratory for sample collection services – additional potential cost savings include laboratory analysis discounts for fewer analytes than included in the approved method, no analysis of the associated field blank if PFAS are not detected in the sample, and discounts for multiple samples per monitoring period.

MCL exceedances

In the occurrence data used in the development of this rule, either the PFOA MCL or the PFOS MCL or both MCLs were exceeded at 7.4% of the sites sampled. This exceedance rate may overestimate the exceedance rate for the other PWSs in Pennsylvania that were not sampled because the occurrence data sampling predominately targeted sites near PSOCs. However, the occurrence data provides the most relevant information currently available on the prevalence and levels of PFAS in PWSs in Pennsylvania. Based on the occurrence data, it is estimated that up to 7.4% of PWS EPs may exceed one or both MCLs. Excluding consecutive water systems and assuming small systems have only one EP, at an estimated noncompliance rate of 7.4%, approximately 110 systems of the 1,496 small systems that are considered small businesses may exceed one or both MCLs.

For systems that exceed one or both MCLs, one way they may be able to achieve compliance is to install treatment for PFAS removal. As part of this rulemaking, cost estimates for installation and operation and maintenance (O&M) of granular activated carbon (GAC) treatment and ion exchange (IX) treatment were used for the cost-benefit analysis. An annual average capital cost estimate for treatment installation of $248,025 per 1 million gallons per day (MGD) per EP was used. This represents an average of capital costs for GAC and IX, annualized over a 20-year period at 4% interest. Annual average O&M costs of $163,818 per MGD per EP plus annual performance monitoring costs of $22,167 per EP were also used. 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.

The expected annualized capital costs for a system serving >3,300 customers to install treatment is estimated to be $248,025 per MGD per EP, with annual O&M costs of $163,818 per MGD per EP and annual performance monitoring costs of $22,167 per EP.

According to Department records in the Pennsylvania Drinking Water Information System (PADWIS), the average design capacity of small investor-owned or privately owned water systems affected by this regulation is approximately 0.1 MGD. The expected annualized capital costs for a small system with a design capacity of 0.1 MGD to install treatment is estimated to be $24,803 per EP, with annual O&M costs of $16,382 per EP and performance monitoring costs of $22,167 per EP.

Treatment cost estimates were based on surveys the Department conducted of systems with treatment installed and of treatment technology vendors.

For systems that have multiple water supply sources, another option for achieving compliance may involve source management. Abandoning a source or blending two or more sources are two options that would be less costly than installation and O&M of treatment.

Available funding

There are currently several funding sources available to PWSs for PFAS treatment costs. The Pennsylvania Infrastructure Investment Authority's (PENNVEST) Per- and Polyfluoroalkyl Substances Remediation Program is currently available to remediate PFAS contamination or presence in the water supply of public drinking water supply systems not related to the presence of a qualified former military installation. The Federal Infrastructure Investment and Jobs Act (IIJA) also provides relevant funding, including $4 billion nationally in Drinking Water State Revolving Fund (DWSRF) monies for projects to address emerging drinking water contaminants like PFAS and $5 billion nationally in grants to small and disadvantaged communities for projects addressing emerging drinking water contaminants like PFAS. Over 5 years, the Commonwealth's allocation of these IIJA funds is expected to be $116 million in DWSRF emerging contaminants funds and an additional $140.5 million in funding for projects addressing emerging drinking water contaminants in small and disadvantaged communities, for a total of $256.5 million.

(18) Explain how the benefits of the regulation outweigh any cost and adverse effects.

This rulemaking improves public health protection by ensuring that PWSs provide water that meets lower, more protective standards for PFOA and PFOS than the 2016 HAL established by EPA.

Safe drinking water is vital to maintaining healthy and sustainable communities. Ensuring that water systems are providing drinking water that meets standards based on the most recent research and data can reduce health care costs and prevent illness and possibly death. Improved health benefits expected to result from implementation of the rule include a reduction in instances of developmental effects (including neurobehavioral and skeletal effects) and decreased immune response associated with exposure to PFOA and PFOS, respectively, in drinking water.

The rulemaking reasonably balances the health protection benefits to Pennsylvanians served by PWSs with the increased costs that will be incurred by PWSs in complying with the rule.

In 2022, DPAG provided additional information on the health benefits achieved by these MCLs. In a report titled "Review of Proposed Maximum Contaminant Levels for PFOA and PFOS in Drinking Water for the Commonwealth of Pennsylvania", the DPAG concluded that the proposed MCLs are predicted to have a significant economic benefit to Pennsylvania because the MCLs will reduce health care problems associated with PFAS (DPAG, 2022).

To predict the value of health care benefits, the DPAG used two approaches – the value transfer method and the counterfactual method. The value transfer method applies and scales quantitative estimates of health care impact costs from one study site to another. The counterfactual method assumes that reduction in exposure to PFOA and PFOS from drinking water will result in a health care cost benefit equal to estimated health care costs attributable to the base exposures to PFOA and PFOS. Although each of these methods has their limitations, it is possible to estimate projected savings from reducing exposure to PFOA and PFOS.

DPAG's health care analysis was broken down into three steps: (1) testing whether the selected MCL will result in hypothetical serum levels known to be associated with disease specific critical effects

identified by the DPAG working group; (2) applying the counterfactual method to data derived from a study of a subpopulation of Pennsylvanians near a PFAS-contaminated site to estimate health care benefits for that group; and (3) deriving a value transfer estimate from other health care impact studies.

DPAG reviewed several studies that examined the exposure response relationship between PFOA levels and low birth weight. The authors of the Malits study selected a maternal serum level of 3.1 ng/mL as a reference level (Malits 2018); below this level, the adverse health effects on low-birth-weight infants would be reduced. The 3.1 ng/mL level also represents the upper limit of the lowest tertile in the study by Maisonet and colleagues (Maisonet 2012) and represents the point above which statistically significant associations have been demonstrated when median serum or plasma levels during pregnancy were above approximately 3.1 ng/mL (Maisonet 2012; Fei 2011; Wu 2012).

DPAG utilized a serum PFAS calculator developed by Bartell to estimate blood serum concentrations of PFOA, based on an initial serum concentration and proposed levels of PFOA (Bartell 2017). DPAG found that the model predicts that a woman of childbearing age would reach a steady-state PFOA serum level of 3.1 ng/mL if the consumed water was at the proposed MCL of 14 ng/L. Furthermore, the Bartell calculator confirms that the proposed MCL of 14 ng/L for PFOA is protective and is consistent with the Department's analysis that the MCL represents a 90% improvement in blood serum levels compared to the serum level predicted at the EPA HAL of 70 ng/L (DPAG, 2022).

DPAG conducted a similar analysis for PFOS using data from the Grandjean (2012) study. The method developed by Bartell predicts that in women of childbearing age, the PFOS MCL of 18 ng/L would result in a steady-state serum level of 7.2 ng/L, which is below the lower bound of interquartile range and the geometric mean in mothers in the Grandjean study.

To summarize, DPAG's review of PFAS blood serum levels at various PFAS concentrations in drinking water correlate well with the Department's assessment of at least 90% improvement of public health at the proposed MCLs.

In estimating the health care benefits for the MCLs, DPAG noted that Malits (2018) estimated the total socioeconomic cost of PFOA-attributable low-birthweight births in the United States from 2003 through 2014 (over 11 years) was $13.7 billion. These costs included the direct hospital costs at the time of birth and lost economic productivity due to low-birthweight births being associated with longer-term outcomes such as lower lifetime earning potential. To determine what this would mean in Pennsylvania, DPAG applied a value transfer method that assumes a scalable relationship between impacts of PFOA-attributable low-birthweight births quantified by Malits in the total United States population. Since 4.0% of the United States population lives in Pennsylvania, the total costs for the entire statewide population due to low birthweight from PFOA exposure for the same period (2003 – 2014) are calculated to $548 million (approximately $637.58 million in 2022 dollars). To compare the costs and benefits to the Commonwealth's PWSs and the 11.9 million customers they serve, DPAG estimated the total socioeconomic costs equate to $583 million in 2022 dollars. In other words, the PFOA MCL of 14 ng/L is estimated to result in health care cost savings of $583 million over a similar time period, or an average of $53 million annually.

DPAG analyzed two additional studies to inform the estimated annual health care costs. In 2018, Nair studied communities near two former military bases in Pennsylvania that were exposed for several decades to PFAS through contaminated drinking water (Nair 2021). The population in that community was estimated to be 84,000. Serum PFAS levels were compared with the national averages for 2013-2014 and their relationships with demographic and exposure characteristics were analyzed. The average

levels of PFOA and PFOS among the study participants were 3.13 and 10.24 ng/mL, respectively. Overall, 75% and 81% of the study participants had levels exceeding the national average for PFOA (1.94 µg/L) and PFOS (4.99 µg/L), respectively. This study places these 2018 Pennsylvania communities in the same broad category as the 2003 National Health and Nutrition Examination Survey data for the United States population. A similar value transfer analysis suggests that the total health care costs associated with PFOA exposure in these Pennsylvania communities alone over a similar time period (11 years) would be $4.3 million in 2022 dollars. Assuming that PFAS levels fell in these Pennsylvania communities in the same manner that they fell nationally, the costs would average to $390,000 per year.

Finally, DPAG reviewed a study by the Nordic Council of Ministers (2019) that estimated the annual monetized impact of elevated mortality due to PFAS exposure ranged from $3.5 to $5.7 billion for a total population of 20.7 million people. Adjusted for the 11.9 million Pennsylvanians served by public water, this produces a value transfer estimate of $2 to $3.3 billion. This suggests that PFAS contamination in drinking water may account for 2% to 3% of the total annual health care costs in Pennsylvania, which are estimated by the Kaiser Family Foundation at $120 billion annually (KFF 2022).

(19) Provide a specific estimate of the costs and/or savings to the **regulated community** associated with compliance, including any legal, accounting or consulting procedures which may be required. Explain how the dollar estimates were derived.

Compliance Monitoring Costs

Compliance monitoring cost estimates for this rulemaking were determined based on a survey the Department conducted of laboratories accredited by Pennsylvania for PFAS analysis by one or more of the analytical methods in the rule, 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 the rule, initial quarterly monitoring for CWS and NTNCWS serving a population of more than 350 persons begins January 1, 2024, and initial quarterly monitoring for CWS and NTNCWS serving 350 or fewer persons begins January 1, 2025. This population breakdown was selected to evenly split initial monitoring across two years in order to ease laboratory capacity issues and allow small systems more

time to prepare for compliance monitoring. Based on the number of PWSs and EPs in PADWIS at the time of this 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). Initial quarterly monitoring for BVRB systems begins January 1, 2024. However, in response to public comments, water systems may be able to use data collected under EPA's Fifth Unregulated Contaminant Monitoring Rule (UCMR5). Water systems may adjust their UCMR5 schedule to coincide with their initial monitoring begin date or submit a request to DEP to adjust their initial monitoring begin date to coincide with their UCMR5 schedule. This is an additional cost savings by eliminating duplicate monitoring.

The rule 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 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 and/or PFOS 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. However, 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 three 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 the response to question 17), 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 and/or PFOS 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 Pennsylvania 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 3 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 3. 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 four years is $4,397,916.

Treatment costs

Treatment cost estimates were determined based on a survey conducted of Pennsylvania systems with existing PFAS treatment and of PFAS treatment manufacturers, a PFAS Case Study published by the American Water Works Association (AWWA, 2020), and from information provided by members of the Association of State Drinking Water Administrators (ASDWA). Costs were provided for GAC, 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.

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.

All treatment costs were normalized to construction costs for treating 1 MGD. As shown in Table 4, 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 4. 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 5, 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 5. 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 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 MCL for PFOA also exceeded the MCL for PFOS. In the occurrence data, the percentage of EPs exceeding the MCL for PFOA and/or the MCL for PFOS was 7.4%. However, this exceedance rate may overestimate the exceedance rate for the other PWSs in Pennsylvania 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 EPs exceeding either MCLs 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 Pennsylvania. 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 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 6.

Table 6. 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 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 above, PENNVEST approved an additional funding program in 2021 under authority of Act 101 of 2019. 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.

Additionally, and as noted in the response to question 17, IIJA also provides relevant funding, including $4 billion nationally in DWSRF monies for projects to address emerging drinking water contaminants like PFAS and $5 billion nationally in grants to small and disadvantaged communities for projects addressing emerging drinking water contaminants like PFAS. Over 5 years, the Commonwealth's allocation of these IIJA funds is expected to be $116 million in DWSRF emerging contaminants funds and an additional $140.5 million in funding for projects addressing emerging drinking water contaminants in small and disadvantaged communities, for a total of $256.5 million.

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.

(20) Provide a specific estimate of the costs and/or savings to the **local governments** associated with compliance, including any legal, accounting or consulting procedures which may be required. Explain how the dollar estimates were derived.

The only costs to local government are costs incurred by systems that are owned and/or operated by local government. The cost estimates are based on the figures in question 19. Of the 3,117 PWS affected by this rulemaking, 291 are owned by municipalities.

There is currently no reliable way to predict which specific PWSs will need to conduct repeat compliance monitoring, at what frequencies, or which specific PWSs will need to install additional treatment as a result of this rulemaking. Therefore, the only costs for municipal-owned PWSs that may be estimated with reasonable certainty at this time are for the initial quarterly monitoring and annual monitoring, which are estimated to be $2,464 the first year and $616 for each year subsequent. However, as noted in the response to question 19, for municipal-owned systems where initial monitoring results do not detect PFOA or PFOS, the frequency of repeat monitoring would be reduced from annual to once every three years.

(21) Provide a specific estimate of the costs and/or savings to the **state government** associated with the implementation of the regulation, including any legal, accounting, or consulting procedures which may be required. Explain how the dollar estimates were derived.

The costs to state government are those incurred by systems that are owned and/or operated by state government and costs to the Department associated with implementing and administering the rule. The cost estimates are based on the figures in question 19. Of the 3,117 PWS affected by this rulemaking, 30 are owned by state government entities, including the Department of Corrections, the Department of Conservation and Natural Resources, the Department of Military and Veterans Affairs, the Pennsylvania State System of Higher Education, and the Department of Human Services.

There is currently no reliable way to predict which specific PWSs will need to conduct repeat compliance monitoring, at what frequencies, or which specific PWSs will need to install additional treatment as a result of this rulemaking. Therefore, the only costs for state-owned PWSs that may be estimated with reasonable certainty at this time are for the initial quarterly monitoring and annual monitoring, which are estimated to be $2,464 the first year and $616 for each year subsequent. However, as noted in the response to question 19, for state government-owned systems where initial monitoring results do not detect PFOA or PFOS, the frequency of repeat monitoring would be reduced from annual to once every three years.

(22) For each of the groups and entities identified in items (19)-(21) above, submit a statement of legal, accounting or consulting procedures and additional reporting, recordkeeping or other paperwork, including copies of forms or reports, which will be required for implementation of the regulation and an explanation of measures which have been taken to minimize these requirements.

Paperwork and reporting requirements include:

- Reporting of PFAS monitoring results using existing electronic reporting systems.
    - DEP's *Drinking Water Electronic Lab Reporting (DWELR) System*
- Optional monitoring waiver application using existing monitoring waiver application modules and forms.
    - *Monitoring Waiver Applications* (3930-FM-BSDW0020)
- Public water supply permit application, in the event of treatment installation to reduce PFAS levels, using existing permit application modules and forms.
    - *Public Water Supply Permit Application* (3900-PM-BSDW0002)
- Public notification (PN) and certification, in the event of an MCL exceedance, using existing forms and templates for Tier 2 PN.
    - *Public Notification (PN) Certification Form* (3930-FM-BSDW0076)
    - *Standard Health Effects Language for Public Notification* (3930-FM-BSDW0190)

(22a) Are forms required for implementation of the regulation?

No new forms are required for implementation of the regulation. The existing forms listed above are required for implementation of this regulation.

(22b) If forms are required for implementation of the regulation, **attach copies of the forms here.** If your agency uses electronic forms, provide links to each form or a detailed description of the information required to be reported. **Failure to attach forms, provide links, or provide a detailed description of the information to be reported will constitute a faulty delivery of the regulation.**

No new forms are required for implementation of the regulation. The existing forms listed above are required for implementation of this regulation.

(23) In the table below, provide an estimate of the fiscal savings and costs associated with implementation and compliance for the regulated community, local government, and state government for the current year and five subsequent years.

	Current FY 2022-23	**FY +1 2023-24**	**FY +2 2024-25**	**FY +3 2025-26**	**FY +4 2026-27**	**FY +5 2027-28**
SAVINGS:	**$**	**$**	**$**	**$**	**$**	**$**
Regulated Community	0	0	0	0	0	0
Local Government	0	0	0	0	0	0
State Government	0	0	0	0	0	0
Total Savings	0	0	0	0	0	0
COSTS:						
Regulated Community	0	4,644,640	7,058,495	63,884,359	123,854,360	123,854,360
Local Government	0	0	0	0	0	0
State Government	0	0	0	0	0	0
Total Costs	0	4,644,640	7,058,495	63,884,359	123,854,360	123,854,360
REVENUE LOSSES:	0	0	0	0	0	0
Regulated Community	0	0	0	0	0	0
Local Government	0	0	0	0	0	0
State Government	0	0	0	0	0	0
Total Revenue Losses	0	0	0	0	0	0

The estimated costs to the regulated community include the estimated compliance monitoring costs presented in Table 3 in the response to question 19 plus the estimated annual treatment capital, O&M, and performance monitoring costs presenting in Table 6 in the response to question 19. The compliance monitoring costs for FY+5 are assumed to be the same as the compliance monitoring costs for FY+4 (Year 4 in Table 3). For purposes of totaling costs, the costs that vary with system design capacity (treatment O&M costs and treatment capital costs) were multiplied by a benchmark design capacity of 1 MGD. As described in the response to question 19, 280 systems are estimated to install treatment: 139 systems based on initial compliance monitoring conducted in FY+1 and 141 systems based on initial compliance monitoring conducted in FY+2. To account for the time these systems would need to install treatment, the annual treatment costs (capital, O&M, and performance monitoring costs) are accounted

for two years following the initial compliance monitoring. In other words, the treatment costs start in FY+3 for the 139 systems that install treatment based on initial compliance monitoring conducted in FY+1, and the treatment costs start in FY+4 for the 141 systems that install treatment based on initial compliance monitoring conducted in FY+2. For reasons discussed in the responses to questions 20 and 21, the estimated costs to systems owned by local and state governments are included with the costs to the regulated community, rather than broken out separately.

(23a) Provide the past three-year expenditure history for programs affected by the regulation.

Program	FY -3 (2019/20)	FY -2 (2020/21)	FY -1 (2021/22)	Current FY (2022/23)
Environmental Program Management (161-10382)	$27,920,000	$32,041,000	$34,160,000	$35,739,000
Safe Drinking Water Fund (092-60065)	$4,412,000	$4,874,000	$9,894,000	$12,381,000

(24) For any regulation that may have an adverse impact on small businesses (as defined in Section 3 of the Regulatory Review Act, Act 76 of 2012), provide an economic impact statement that includes the following:

(a) An identification and estimate of the number of small businesses subject to the regulation.

All 3,117 CWS, NTNCWS, and BVRB systems in Pennsylvania are required to comply with this regulation. However, 219 of these systems are consecutive (i.e. purchasing finished water from another PWS) and are not be required to conduct monitoring unless the selling system fails to monitor as required. Of the remaining 2,898 non-consecutive systems, 1,519 are small systems (serving a population of 3,300 persons or fewer) that are owned by a private individual or investor and can be considered as small businesses.

(b) The projected reporting, recordkeeping and other administrative costs required for compliance with the proposed regulation, including the type of professional skills necessary for preparation of the report or record.

Administrative costs associated with this rulemaking may increase minimally, if at all. There are no new administrative requirements; PFOS and PFOA are added to the existing standardized monitoring duties (e.g., sampling and reporting).

(c) A statement of probable effect on impacted small businesses.

Due to economies of scale, small systems with limited customer bases may be impacted more than larger systems. However, these small systems have the same access to funding as other systems. The two most common treatment technologies for PFAS – GAC and IX – are not new technologies. These technologies are currently in use by various PWS types and sizes to treat for other contaminants such as volatile organic contaminants, nitrates, and various ions.

(d) A description of any less intrusive or less costly alternative methods of achieving the purpose of the proposed regulation.

No alternative regulatory schemes were considered because all customers of PWSs deserve equitable water quality and public health protection.

Additionally, the rulemaking provides PWSs the flexibility to select the least costly method to comply. If either PFOA or PFOS is found at levels above the relevant MCL, a PWS has several options for addressing the contamination including taking contaminated sources offline, making operational changes such as blending sources, using alternate sources of supply (developing new sources or using purchased sources from a new interconnect), or adding treatment. Each PWS with PFOA or PFOS levels above the relevant MCL will need to decide the most feasible option for addressing the contamination. PWSs that do not detect PFOA or PFOS at levels above the relevant MCL can request or qualify for reduced monitoring to save costs.

(25) List any special provisions which have been developed to meet the particular needs of affected groups or persons including, but not limited to, minorities, the elderly, small businesses, and farmers.

The rulemaking gives the smallest CWS and NTNCWS (those serving 350 or fewer people) extra time to prepare by proposing for those systems to begin initial compliance monitoring in year 2 rather than year 1. This will assist some small businesses in preparing to comply with the rulemaking.

(26) Include a description of any alternative regulatory provisions which have been considered and rejected and a statement that the least burdensome acceptable alternative has been selected.

No alternative regulatory schemes were considered because all customers of PWSs deserve equitable water quality and public health protection.

The regulatory provisions contain the least burdensome acceptable option because it provides PWSs the flexibility to select the least costly method to comply. If either PFOA or PFOS is found at levels above the relevant MCL, the PWS has several options for addressing the contamination including taking contaminated sources offline, making operational changes such as blending sources, using alternate sources of supply (developing new sources or using purchased sources from a new interconnect), or adding treatment. Each PWS with PFOA or PFOS levels above the relevant MCL will need to decide the most feasible option for addressing the contamination. PWSs that do not detect PFOA or PFOS at levels above the relevant MCL can request or qualify for reduced monitoring to save costs.

(27) In conducting a regulatory flexibility analysis, explain whether regulatory methods were considered that will minimize any adverse impact on small businesses (as defined in Section 3 of the Regulatory Review Act, Act 76 of 2012), including:

a) The establishment of less stringent compliance or reporting requirements for small businesses;

For these provisions, no less stringent compliance or reporting requirements for small businesses were considered.

b) The establishment of less stringent schedules or deadlines for compliance or reporting requirements for small businesses;

For these provisions, no less stringent schedules or deadlines for small businesses were considered. However, smaller systems will not begin initial monitoring until 2025 which allows an additional year for these systems to plan for the monitoring.

c) The consolidation or simplification of compliance or reporting requirements for small businesses;

For these provisions, neither consolidation nor simplification of compliance or reporting requirements for small businesses was considered.

d) The establishment of performance standards for small businesses to replace design or operational standards required in the regulation; and

For these provisions, no performing standards for small businesses to replace design or operational standards required in the regulation for small businesses were considered.

e) The exemption of small businesses from all or any part of the requirements contained in the regulation.

For these provisions, no exemptions for small businesses from all or any part of the requirements contained in the regulation were considered.

Alternative provisions were not considered for small water systems because the customers of water systems classified as small businesses must be afforded the same level of public health protection as customers of large water systems.

(28) If data is the basis for this regulation, please provide a description of the data, explain in detail how the data was obtained, and how it meets the acceptability standard for empirical, replicable and testable data that is supported by documentation, statistics, reports, studies or research. Please submit data or supporting materials with the regulatory package. If the material exceeds 50 pages, please provide it in a searchable electronic format or provide a list of citations and internet links that, where possible, can be accessed in a searchable format in lieu of the actual material. If other data was considered but not used, please explain why that data was determined not to be acceptable.

Substantial studies, reports, and data were used to develop this rulemaking.

Occurrence data:
To determine whether PFAS contaminants were occurring in Pennsylvania's water supplies at frequencies and concentrations expected to be at a level of concern, the Department collected occurrence data on a range of PFAS. The two primary sources for occurrence data were the final results from BSDW's PFAS Sampling Plan and UCMR3 data.

The BSDW PFAS Sampling Plan prioritized sites for targeted PFAS sampling. A literature review identified several likely potential sources of PFAS contamination; specific references reviewed are cited in the sampling plan.

- PA DEP, April 2019, "Pennsylvania Department of Environmental Protection Bureau of Safe Drinking Water PFAS Sampling Plan," Available at www.dep.pa.gov/Citizens/My-Water/drinking_water/PFAS/Pages/DEP-Involvement.aspx.

PWS sources located within 0.5 miles of an identified PSOC were included in the plan as target sites; additional sources located within 0.75 miles of a PSOC were later added to the plan as needed to complete sampling. A selection of baseline sources representing a control group were also included; these baseline sites were PWS sources located at least five miles from a PSOC and within a watershed containing 75% or more forested land. Sampling was planned for 360 target sites and 40 baseline sites. Sampling was conducted beginning in 2020 and ending in March 2021. Samples were analyzed by the

Department's Bureau of Laboratories and a third-party contract lab via EPA Method 537.1. In all, a total of 412 sites were collected and analyzed, representing 372 target sites and 40 baseline sites. Final sampling plan results can be found on the Department's website.

- PA DEP, May 2021, "Summary of Results for SDW Sampling Project Using EPA Method 537.1," Available at www.dep.pa.gov/Citizens/My-Water/drinking_water/PFAS/Pages/default.aspx.

The Department's BSDW also reviewed UCMR3 data for PFAS detections. UCMR3 results can be found on EPA's website.

- US EPA, January 2018, "UCMR 3 Occurrence Data by State," Available at www.epa.gov/monitoring-unregulated-drinking-water-contaminants/occurrence-data-unregulated-contaminant#3.

Toxicology:
Through a toxicology services contract, DPAG – consisting of toxicologists and other scientific professionals at Drexel University – conducted a thorough and independent review of federal and other states' work on MCLs for PFAS, including the available research, data, and scientific studies to develop recommended MCLGs for select PFAS. MCLGs are non-enforceable, 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.

Specific references used by DPAG in this research are cited in the DPAG report and workbook.

- 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.

Analytical considerations:
Resources were consulted to ensure that analytical methods sufficient to support the rulemaking exist, including the following:

- Association of State Drinking Water Administrators (ASDWA), October 2020, "Technical Bulletin to Laboratories Reporting PFAS Analysis Using EPA Methods 533, 537, or 537.1," www.asdwa.org/wp-content/uploads/2020/10/ASDWA-PFAS-Lab-Reporting-Technical-Bulletin-FINAL-101420-1.pdf.
- Association of State Drinking Water Administrators (ASDWA), February 2021, "Per- and Polyfluoroalkyl Substances (PFAS) Laboratory Testing Primer for State Drinking Water Programs and Public Water Systems," www.asdwa.org/wp-content/uploads/2021/02/ASDWA-PFAS-Lab-Testing-Primer-FINAL-02032021.pdf.
- 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, www.epa.gov/sites/default/files/2019-12/documents/method-533-815b19020.pdf.

- 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, https://cfpub.epa.gov/si/si_public_record_Report.cfm?Lab=NERL&dirEntryId=343042.
- 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, https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NERL&dirEntryId=198984&simpleSearch=1&searchAll=EPA%2F600%2FR-08%2F092+.

In addition, the Department conducted a survey of laboratories accredited by Pennsylvania for PFAS analysis to evaluate available lab capacity and minimum reporting limits:

- PA DEP, May 2021, "Summary of Responses from Survey of Pennsylvania Accredited Laboratories for PFAS." (Copy attached.)

Treatment technologies:

The Department conducted a survey of PWSs currently treating for PFAS, other state agencies, and water treatment manufacturers to evaluate treatment technologies and treatment costs.

- PA DEP, July 2021, "PFAS Treatment Survey Response Summary." (Copy attached.)

Cost to Benefits:

To provide additional information to support the cost to benefits analysis, the Department utilized the services of the DPAG by extending the contract with Drexel University. The Department charged DPAG with estimated monetized benefits expected to be realized from implementation of the MCLs.

- DPAG, July 2022, "Review of Proposed Maximum Contaminant Levels for PFOA and PFOS in Drinking Water for the Commonwealth of Pennsylvania." (Copy attached.)
- American Water Works Association (AWWA), 2020, "PFAS Case Study: Cape Fear Public Utility Authority (CFPUA)," www.awwa.org/Portals/0/AWWA/ETS/Resources/Technical%20Reports/CFPUA%20Case%20Study%20Report_FINAL.pdf?ver=2021-01-19-095055-317.
- PA DEP, July 2021, "PFAS Treatment Survey Response Summary." (Copy attached.)

Other States:

- Association of State Drinking Water Administrators (ASDWA), October 2020, "Per- and Polyfluoroalkyl Substances (PFAS) and State Drinking Water Program Challenges," www.asdwa.org/wp-content/uploads/2018/02/ASDWA-PFAS-2-Pager.pdf.

- 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.
- Massachusetts DEP, November 2020, "310 CMR 22.00: The Massachusetts Drinking Water Regulations," www.mass.gov/doc/310-cmr-2200-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," https://ars.apps.lara.state.mi.us/AdminCode/DeptBureauAdminCode?Department=Environment%2C%20Great%20Lakes%20and%20Energy&Bureau=Drinking%20Water%20and%20Environmental%20Health%20Division.
- 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, www.des.nh.gov/rules-and-regulatory/administrative-rules.
- 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)." (Copy attached.)
- New York State Department of Health, July 2020, "Maximum Contaminant Levels (MCLs)." (Copy attached.)
- Ohio Department of Health and Ohio Environmental Protection Agency, December 2019, "Ohio Per- and Polyfluoroalkyl Substances (PFAS) Action Plan for Drinking Water," https://content.govdelivery.com/attachments/OHOOD/2019/12/02/file_attachments/1335154/PFAS%20Action%20Plan%2012.02.19.pdf.
- Post, Gloria B., August 2020, "Recent US State and Federal Drinking Water Guidelines for Per- and Polyfluoroalkyl Substances," *Environmental Toxicology and Chemistry*, Volume 40, Issue 3, pp. 550-563, https://setac.onlinelibrary.wiley.com/doi/full/10.1002/etc.4863.
- 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," https://dec.vermont.gov/content/vermont-water-supply-rule.

Additional resources:

- Bartell, 2017, "Serum PFAS Calculator for Adults." https://www.ics.uci.edu/~sbartell/pfascalc.html
- 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. https://setac.onlinelibrary.wiley.com/doi/10.1002/ieam.258.

- Fei, C., J. Olsen, 2011, "Prenatal exposure to perfluorinated chemicals and behavioral or coordination problems at age 7 years." Environ Health Perspect, 119(4): 573-578. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3080943/.
- Grandjean, P., et al., 2012, "Serum Vaccine Antibody Concentrations in Children Exposed to Perfluorinated Compounds." Journal of the American Medical Association, 307(4): 391-397. https://jamanetwork.com/journals/jama/fullarticle/1104903.
- Kaiser Family Foundation (KFF), 2022, "Health Care Expenditures per Capita by State of Residence in 2014." https://www.kff.org/other/state-indicator/health-spending-per-capita/ (accessed July 1, 2022).
- 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. https://pubs.acs.org/doi/10.1021/acs.estlett.0c00255.
- Longsworth, Sarah Grace, 2020, "Processes and Considerations for Setting State PFAS Standards," Environmental Council of the States, www.ecos.org/documents/ecos-white-paper-processes-and-considerations-for-setting-state-pfas-standards.
- Maisonet, M., et al., 2012, "Maternal Concentrations of Polyfluoroalkyl Compounds during Pregnancy and Fetal and Postnatal Growth in British Girls." Environ Health Perspect, 120(10): 1432-1437. https://ehp.niehs.nih.gov/doi/10.1289/ehp.1003096.
- Malits, J., et al., 2018, "Perfluorooctanoic acid and low birth weight: estimate of US attributable burden and economic costs from 2003 through 2014." International Journal of Hygiene and Environmental Health, 221: 269-275. https://doi.org/10.1016/j.ijheh.2017.11.004.
- Nair, A., et al., 2021, "Demographic and exposure characteristics as predictors of serum per- and polyfluoroalkyl substances (PFAS) levels – A community-level biomonitoring project in Pennsylvania." International Journal of Hygiene and Environmental Health, 231:113631. https://doi.org/10.1016/j.ijheh.2020.113631.
- Nordic Council of Ministers, 2019, "The Cost of Inaction: A socioeconomic analysis of environmental and health impacts linked to exposure to PFAS." https://www.norden.org/en/publication/cost-inaction-0.
- US EPA, May 2016, "Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA)," EPA 822-R-16-005. Available at https://www.epa.gov/sdwa/drinking-water-health-advisories-pfoa-and-pfos.
- US EPA, May 2016, "Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS)," EPA 822-R-16-004. Available at https://www.epa.gov/sdwa/drinking-water-health-advisories-pfoa-and-pfos.
- US EPA, May 2016, "Health Effects Support Document for Perfluorooctanoic Acid (PFOA)," EPA 822-R-16-003. Available at https://www.epa.gov/sdwa/drinking-water-health-advisories-pfoa-and-pfos.
- US EPA, May 2016, "Heath Effects Support Document for Perfluorooctane Sulfonate (PFOS)," EPA 822-R-16-002. Available at https://www.epa.gov/sdwa/drinking-water-health-advisories-pfoa-and-pfos.
- US EPA, January 2018, "UCMR 3 Occurrence Data by State." Available at https://www.epa.gov/dwucmr/occurrence-data-unregulated-contaminant-monitoring-rule#3.

- US EPA, 2020, "The Standardized Monitoring Framework: A Quick Reference Guide," Office of Water (4606M), EPA 816-F-20-002. https://www.epa.gov/sites/default/files/2020-05/documents/smf_2020_final_508.pdf.
- US EPA, February 2020, "EPA PFAS Action Plan: Program Update." www.epa.gov/sites/default/files/2020-01/documents/pfas_action_plan_feb2020.pdf.
- 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, pp. 12272-12291. www.federalregister.gov/documents/2021/03/03/2021-04184/announcement-of-final-regulatory-determinations-for-contaminants-on-the-fourth-drinking-water.
- 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. www.federalregister.gov/documents/2021/03/11/2021-03920/revisions-to-the-unregulated-contaminant-monitoring-rule-ucmr-5-for-public-water-systems-and.
- Wu, K., et al., 2012, "Association between maternal exposure to perfluorooctanoic acid (PFOA) from electronic waste recycling and neonatal health outcomes." Environmental International, 48:1-8. https://doi.org/10.1016/j.envint.2012.06.018.

(29) Include a schedule for review of the regulation including:

A. The length of the public comment period:	60 days
B. The date or dates on which any public meetings or hearings will be held:	March 21, 22, 23, 24 and 25, 2022
C. The expected date of delivery of the final-form regulation:	Quarter 4 2022
D. The expected effective date of the final-form regulation:	Upon publication in the *Pennsylvania Bulletin*
E. The expected date by which compliance with the final-form regulation will be required:	Upon publication in the *Pennsylvania Bulletin*
F. The expected date by which required permits, licenses or other approvals must be obtained:	January 2025

(30) Describe the plan developed for evaluating the continuing effectiveness of the regulations after its implementation.

The amendments will be reviewed in accordance with the Sunset Review Schedule published by the Department.