Technical Review of ‘Extending the Compliance Deadline for the PFOA and PFOS Maximum Contaminant Levels’

July 14, 2026

Prepared by Elin Warn Betanzo, Safe Water Engineering, LLC and Vanessa Speight, PhD.

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Executive Summary

This memo examines the US Environmental Protection Agency (EPA) proposed rule ‘Extending the Compliance Deadline for the perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS) Maximum Contaminant Levels’ (“proposed rule”), published in the Federal Register on May 20, 2026. This rule proposes to extend the dates of Maximum Contaminant Level (MCL) compliance for two years through a national exemption process administered directly by EPA.

Based on the analysis presented in this memo, the following summarizes the reasons the proposed rule will not benefit the majority of water systems or the population of the United States:

1. Costs of treatment equipment, construction, and labor are highly likely to increase during the two-year delay based upon construction industry trends.
2. The delay does not open significantly different new opportunities for contaminant reduction through new treatment technologies. While incremental treatment advances are ongoing, advanced technologies beyond the current best-available technologies (BATs) are not anticipated to be readily implementable without pilot testing to demonstrate performance during the proposed two-year delay.
3. Stakeholders, states, and water utilities will need to take time to review the proposed and final rule to determine how it impacts compliance and how to change compliance decisions based on the revised requirements, wasting time that could be spent directly on complying with the PFOS and PFOA MCLs.
4. Regulatory uncertainty delays and prolongs decision making, putting off treatment and compliance decisions. This uncertainty also interrupts sales and manufacturer supply chains. Engineering designs, purchasing decisions, and purchase orders could be advancing right now if there was regulatory certainty.

5. A rule exemption process is already available under the Safe Drinking Water Act (SDWA) that does not require the development of any new logistical processes. It already includes more outreach and communications than the exemption under the proposed rule and therefore would provide greater benefit to the communities served by these water systems.
6. EPA's OUTreach, Tackling Emerging Contaminants (TEC), and Real WaterTA programs are funded only one year at a time, with no guaranteed funding during the two-year exemption period. Only 142 water systems per year are supported by these programs at current funding levels. The delay in implementation will not result in a significant number of systems receiving services.
7. The proposed rule does not come with any new funding for treatment or operator training. The delay comes just as Infrastructure Investment and Jobs Act (IIJA) funds are running out, making funding even less available than it is today. If there are no accompanying changes to funding and service delivery, the two-year exemption will not result in any meaningful change in water systems' ability to comply with the MCLs.
8. The proposed exemption increases the amount of work that water utilities are required to complete if they exceed 12 parts per trillion (ppt) of PFOS and/or PFOA, making water utilities more likely to focus on long term treatment to comply with the MCLs rather than taking the opportunity of the 2-year exemption.
9. The proposed pitcher filter control measure does not meet the requirements to roll into a long-term compliance mechanism, effectively duplicating work, increasing costs, and not protecting public health.
10. The proposed pitcher filter control measure presented to protect public health during the two-year exemption period does not apply to 75% of water systems that need to install treatment to comply with the MCLs, and the quantified pitcher filter program is designed to reach only 20% of the impacted consumers.
11. The proposed pitcher filter control measure does not include any requirement to evaluate selected pitcher filters for the specific source water quality at the water system, potentially leaving consumers much less protected than filter distribution would suggest. There is no requirement for the pitcher filters to reduce PFOS and PFOA levels to the MCL of 4 ppt, even though devices are currently available.
12. States and EPA will both have to create new processes to track and accommodate the proposed two-year exemption.

13. Several thousand water systems will not be eligible for the proposed two year exemption because they are located in states that already have or will apply for primacy before the exemption process becomes available.

In addition, EPA has experience in complex direct implementation from the Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR) and Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR), demonstrating their technical ability to process exemptions under the provisions already available in the SDWA.

Based on this assessment, there appears to be no need for a two-year exemption process in addition to the current exemption process available in the SDWA. The need that exists can be met through the existing process. Finally, there are real costs to finalizing the two-year exemption option with unclear or non-existent benefits from a water system implementation perspective.

1.0 Introduction

This memo examines the US Environmental Protection Agency proposed rule 'Extending the Compliance Deadline for the PFOA and PFOS Maximum Contaminant Levels' ("proposed rule"), published in the Federal Register on May 20, 2026. The memo summarizes the published academic literature and water industry publications to review the statements in the proposed rule about costs, treatment technologies, related regulations, water system capacity, funding, and point of use (POU) / point of entry (POE) filters.

1.1 Primacy and applicability

In a September 30, 2025 memo (Echeverria, 2025), EPA clarified that states had the opportunity to apply for a primacy extension for the PFAS National Primary Drinking Water Regulation (NPDWR). EPA recommended doing so because it would conserve resources until there is greater clarity about the PFAS rule that they must adopt. If a primacy agency did not apply for the two-year extension, they were required to submit a final primacy application package to EPA by April 27, 2026 (Echeverria, 2025). Systems in states that have primacy for the PFAS rule are not eligible for the two-year exemption opportunity presented under the proposed rule. Based on the April deadline, EPA had knowledge of whether any state had applied for primacy by the date that the proposed rule was published, on May 18, 2026. This information was not provided in the federal register notice.

As of June 23, 2026, the Congressional Research Service (CRS) reports that Idaho and Illinois have applied for primacy for the 2024 PFAS regulation and 47 states, the territories, and the Navajo Nation have applied for an extension (CRS, 2026). Assuming EPA will approve these primacy applications, this decreases the number of systems eligible for the proposed two-year exemption.

Regarding the effective date of primacy, the Stage 2 DBPR Federal Register notice includes the following: "States that have primacy for every existing NPDWR already in effect may obtain interim primacy for this rule, beginning on the date that the State submits the application for this rule to USEPA, or the effective date of its revised regulations, whichever is later" (US EPA, 2006). This statement is not included in the 2024 PFAS Federal Register notice, but there is one vague reference to interim primacy that is not defined. It is not clear whether Illinois or Idaho received interim primacy for the PFAS rule on the date they submitted their applications for rule primacy.

In addition to Illinois and Idaho, there are four states that have already adopted the 2024 PFOS and PFOA MCLs into state law. These are Maine, Vermont, and Wisconsin. New York has passed the bill and as of this writing is still awaiting the governor's signature. Although they have not yet applied for primacy, it is reasonable to expect that they intend to apply and implement the early provisions directly, and that interim primacy would also be assigned to these states per previous rules. According to the Safe Drinking Water Information System (SDWIS) Federal (Fed) inventory of 2026 Q2, of 66,415 active community and non-transient non community water systems nationwide, this would remove 9,476 water systems, or 14% from the total eligible for the two-year exemption (US EPA, 2026f).

States can submit additional primacy applications before April 27, 2028. If approved in advance of the exemption application deadline, any public water system in those states would also not be eligible for the exemption. According to the proposed rule preamble (91 Fed. Reg. at 29438), if a state obtains primacy after the EPA has issued exemptions, the state could terminate any federally issued exemption or would have to incorporate EPA-issued exemptions explicitly into the adopted state regulations and primacy applications. This option either decreases the number of water systems getting access to the exemption, or it increases the work the state must complete when applying for primacy. This demonstrates that the proposed exemptions will not be available to 100% of water systems with exceedances.

1.2 Proposed rule comparison to EPA capacity during early implementation of the Stage 2 DBPR and LT2ESWTR

A recent example of EPA's capacity to provide implementation oversight before states achieve primacy can be found in the Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR). The Initial Distribution System Evaluation (IDSE) plan and report requirements of the Stage 2 DBPR were to be completed by the largest water utilities and any smaller interconnected water utility (i.e., consecutive system in a combined distribution system) three years prior to the SDWA MCL effective date of the rule, allowing water utilities to be prepared for compliance on that date. In addition, water utilities were also responsible for collecting source water cryptosporidium samples under the LT2ESWTR before most states received primacy. These two rules, taken together, are often referred to as the Microbial and Disinfection Byproduct (MDBP) Rules.

Under the Stage 2 DBPR, water systems were required to submit IDSE plans for primacy agency review and approval prior to conducting their IDSE. Systems had a choice of completing the IDSE requirement by providing a 40/30 certification (waiving the requirement due to low contaminant levels), a standard monitoring plan, or a system specific study. All of these options included more documentation and supporting data than the proposed two-year exemption option of the current proposal.

EPA was responsible for reviewing all IDSE submissions and overseeing Cryptosporidium sampling for all states that had not applied for early primacy. This covered 4,030 public water systems nationwide for the Stage 2 DBPR that were on the two earliest pre-primacy compliance schedules, as well as 363 of these that were required to conduct source water monitoring under LT2ESWTR on the same schedule (USEPA, 2026f).

Although there was pushback from the American Water Works Association, some states, and some water utilities to EPA providing early implementation support because states had more expertise and experience with the water utilities, the FR notice states "However, the Agency believes that delaying implementation of risk-based IDSE targeting activities until States receive primacy is an unacceptable delay in public health protection and also inconsistent with the Advisory Committee's recommendations" (US EPA, 2006).

In comparison to the MDBP Rules, EPA assumes that for the 2-year exemption provision EPA would be responsible for reviewing exemption applications for an estimated mean of 4,310 systems and a range of 3,086 – 5,821 according to the EA for the 2024 PFAS NPDWR (US EPA, 2024c). This is similar in scope to the number of reviews required under the MDBP rules. The scope of the submission and review for the two-year exemption, which consists primarily of certifications made by the operator, is much smaller than was required for the MDBP Rules early implementation, which included technical sampling plans, data submissions to qualify for waivers, and hydraulic modeling results. Even system-specific exemptions under section 1416 may be less complicated than the reviews conducted under the MDBP Rules. EPA has established precedents for being able to review technical submissions when states do not have primacy.

The analysis that follows, as well as the preceding primacy assessment, establishes that only a subset of the 3,086 – 5,821 estimated water systems that must make changes to comply with the PFOS and PFOA MCLs will apply for an exemption. EPA's record shows that they are entirely capable of handling this workload using the exemption process already available in the SDWA, and the exemption process of this proposed rulemaking is unnecessary.

2.0 Costs

The mere act of proposing this rule has increased costs and distraction for states, water systems, industry, and other stakeholders. This section reviews the costs incurred because of the proposed rule and the costs to comply with the proposed two-year exemption.

2.1 Review of latest costs

2.1.1 High level comparison of EA costs to original PFAS rule costs

The proposed rule Economic Analysis (US EPA, 2026d) does not recalculate any costs from the final PFAS rule. It merely calculates the incremental cost of complying with the proposed two-year exemption option.

Consequently, my original critique of the rule costs remains valid (Betanzo, 2023).

2.1.2 The Economic Analysis overestimates number of systems applying for exemption

The Proposed Rule Economic Analysis assumes that all water systems that must install treatment to comply with the PFOS and PFOA MCLs will apply for the two-year exemption. There are many reasons why this is a significant overestimate. Although accurate numbers are not available, the categories described below describe the categories of water utilities that we know will not apply for the two-year exemption, thus making it unnecessary to simplify paperwork processing for the EPA.

EPA assumes that regulated water systems will only make decisions based on cost minimization. This assumption overestimates participation in the proposed exemption process. While this is true of some water systems, there are also many water systems that make decisions based on public health protection and risk reduction. Although difficult to quantify, the evidence that these systems exist is clear by the number of water utilities that are following through with PFAS treatment purchases despite the current regulatory uncertainty around requirements. There are many that are delaying action, but also another set that is moving forward regardless. Several systems with higher source water levels have already installed treatment and are already in compliance, and another set continues to work towards treatment installation, regardless of regulatory uncertainty, to protect their customers prior to the 2029 deadline.

The number of systems that have access to the proposed two-year exemption is decreased by states that have already or plan to apply for primacy. In addition to Illinois and Idaho, there are four states that have already adopted the 2024 PFOS and PFOA MCLs into state law. These are Maine, Vermont, and Wisconsin. New York has passed the bill and as of this writing is still awaiting the governor's signature. Although they have not yet applied for primacy, it is reasonable to expect that they intend to apply and implement the early provisions directly, and that interim primacy would also be assigned to these states per previous rules. According to the SDWIS Fed inventory of 2026 Q2, of 66,415 community and non-transient non community water systems nationwide, this would remove 9,476 water systems, or 14% from the total eligible for the two-year exemption (US EPA, 2026f).

When it comes to compliance with new or existing regulations, there is a category of water utility that does the minimum possible and will not take any action until the rule is effective and possibly not until violations are issued. These water systems will not even make the effort to apply for an exemption because it represents additional work beyond the status quo. These systems will not use the exemption option.

Finally, systems with PFOS and/or PFOA greater than 12 ppt in their water that would be required to implement interim measures under the proposed exemption may prefer to focus on long-term compliance treatment rather than short-term intervention. Every minute and dollar spent on short term education and filter delivery programs might be more efficiently spent on planning, financing, and procuring the long-term treatment system for compliance.

2.1.3 Filter unit costs and inadequacy of the quantified filter distribution program

The proposed rule relies on the Economic Analysis for the Lead and Copper Rule Improvements (LCRI) (US EPA 2024d) to estimate the cost of a pitcher filter control measure plan. The interim pitcher filter control measure during the two-year exemption period is distinct and separate from the potential POU Reverse Osmosis (RO) option that may become available as a Small System Compliance Technology (SSCT) in the future for small system compliance if or when NSF/ANSI standards are updated to ensure treatment brings PFOS and PFOA levels to meet or below the 4 ppt MCLs.

In the proposed rule, pitchers are not envisioned as transitioning into a long-term treatment technology as an SSCT. The preamble states “EPA forecasts that the large majority of all systems exceeding the PFOA and/or PFOS MCLs will install advanced treatment technologies in order to come into compliance.” This signals EPA’s intent that pitcher filters will not be a long-term compliance method as they are not advanced treatment technology. The proposed rule also states that control measures (i.e., pitcher filters) “…are intended to temporarily decrease concentrations of PFOA and PFOS and associated exposure during the period of the exemption until longer term and more effective solutions can be implemented to achieve MCL compliance.” This further emphasizes that EPA envisions any pitcher filter program to be additional to a long term compliance solution rather than a direct transition to a long term program. Further marking this point, the final PFAS NPDWR Economic Analysis only presents costs for POU RO units as a potential future POU compliance technology.

Therefore, it is important to consider the estimated costs for the interim control measure to be an additional cost that does not transition directly into a long term POU treatment program. If POU RO devices get certified as envisioned in the proposal, a water utility selecting this SSCT will essentially need to start over with the POU treatment program, duplicating and expanding several steps from the interim intervention because the parts, installation, and replacement parts will be entirely different. The pitcher filter interim program duplicates costs, does not provide protection to all residents, and distracts water systems from the steps they need to take for long term compliance.

US EPA (2024d) estimates 5.5 hours per community water system (CWS) and 3 hours per non transient non community water system (NTNCWS) to develop the two-year pitcher filter plan. EPA estimates that this plan will be short, that CWSs will add information on how to obtain a filter to their water bill or on their website, will make filters available at their office or other central location, and track filter distribution by adding a column to their service line inventory. While 5.5 hours might be adequate for writing up a conceptual plan, it does not account at all for the implementation, logistics, and maintenance of a filter distribution program.

Under the LCRI, water systems have already invested in developing inventories and tracking systems for locations with lead service lines (LSL), galvanized requiring replacement (GRR), or unknown service lines. As a result, there are already mechanisms for individual contact with individual customers via other provisions of the LCRI. Service locations requiring filters under the LCRI are typically a subset of the total service lines within a water utility. A proactive filter distribution program would not be initiated until after a second lead action level exceedance (LALE) under the LCRI (earliest possible date would be in 2029). Consequently, by definition, this requirement would not come into play until after contact has been made with most if not all LSL, GRR, and unknown service line locations for other rule provisions. In other words, the LCRI filter distribution program builds on other rule provisions.

In contrast, the filter delivery required for the proposed exemption at water systems measuring PFOS and PFOA greater than 12 ppt will be for all service connections and will begin before compliance with all other portions of the rule because those would be delayed during the two-year exemption period. In other words, this filter program will precede all other compliance activities rather than building off of other compliance steps as it does in the LCRI. In addition, because EPA assumes that this plus public outreach would be the only public health interventions per the exemption process, a far more elaborate delivery and education program is necessary. In addition to writing the 5.5 hour conceptual plan, a water utility would need to complete the following to implement a comprehensive, health protective pitcher filter program:

- Budget or apply for funding to purchase the filters. This often requires lead time.
- Test a variety of pitcher filters to identify the models that are most effective for PFOS and PFOA reduction in the specific water quality of the purchasing water system (see section 6.0 for more discussion).
- Go through the filter procurement process. This will happen during a time when there is very high competition for filter availability. It is not clear if there is sufficient supply to meet demand.
- Secure a location to store filters; the location may need to be temperature controlled depending on the local climate.
- Create a filter tracking system. Because this filter tracking system would include all service locations, it will be a different inventory and tracking system compared to the LCRI requirements. Some utilities might have to develop strategies for tracking compliance with both rules, thus increasing complexity and overall cost. Not all pitcher filters that are certified for lead reduction are also certified for PFOS or PFOA reduction, even at the higher current NSF/ANSI standard.
- Develop standard operating procedures (SOPs) for the filter program.

- Develop outreach documents and a program website explaining the filter program.
- Hire or assign staff or contractors to implement the program and deliver the filters.
- Provide a script and frequently asked questions to the customer service center to answer calls from residents regarding the pitcher filter program.
- Ensure all filter deliveries are tracked in a central database and residents are notified on time for cartridge replacement.

Each of these filter program steps would be happening while the water system is also pursuing their long-term treatment option that required two additional years to pursue. The increased effort might be too much for an overburdened water system to implement successfully.

Next, the described filter program is completely inadequate for achieving the stated public health goals.

- It is not acceptable to design a public health protection program that is only expected to protect 20% of the population (see US EPA 2024d Table 4-9, "Percent of eligible CWS households that will pick up pitcher filter = 20%"). A program that relies on residents to come to the water department to pick up their filter is designed to have this low uptake rate. The Economic Analysis describes a passive program that relies on impacted residents to do the work for the water system.
- Tully et al. (2024), and Bosscher et al. (2019) emphasize the importance of filter education for ensuring residents understand the importance of using the filter and how to maintain their filter. Betanzo et al. (2023) emphasizes the importance of delivering filters and providing installation support for ensuring residents follow through on using the filters. Simply making filters available and expecting residents to pick them up will not achieve the public health benefits contemplated by this provision of the rule. If a filter program is used to provide interim public health protection, it must be proactively delivered to all residents along with education and properly timed reminders to change filter cartridges.
- If filter cartridges are not replaced on schedule, or if pitcher filters are stored outside the refrigerator, there is a large possibility of the filters themselves becoming a source of contamination. Education and ongoing interaction with residents are essential to prevent a pitcher filter program from becoming another source of drinking water contamination.
- It is inadequate to design a filter program that provides two years of supplies up front, especially when the filter cartridges need to be changed every 3 to 6 months. The replacement cartridges will get lost, residents will not replace them on

schedule, and the water system will have wasted money and residents will not be protected. As described by Denver Water (2024), an effective filter distribution program requires active, ongoing education, door to door interaction, as well as reminders and replacement cartridge delivery around the time when cartridges should be replaced.

- The pitcher filter program quantified and described in the Economic Analysis is a passive, ineffective system that will not reach even half of the impacted population, will increase costs to the water utility, will potentially increase consumption of contaminated water, and not address the risk that the PFAS NPDWR was promulgated to address. An active filter delivery program designed to protect public health will cost much more than the described passive program.
- US EPA (2026d) states that all taps at NTNCWS will receive their own pitcher filter, but only one filter will be provided per CWS household. Most homes have at least one kitchen and one bathroom tap where water is consumed, and many have 3 or more taps intended for consumption. If only one filter is delivered per household, it is a given that untreated water will be consumed even at the 20% of anticipated homes that receive filters under the envisioned program. The assumption that 100% of the water in the homes that receive filters will not exceed 20 ppt is not appropriate given the filter program described here.

As described here, the filter program described in the proposed rule is completely inadequate for protecting public health. The cost of filters alone for an adequate filter program would be at least ten times the cost of the program quantified in the economic analysis, because an adequate filter program would plan to deliver filters to all service locations (5*20% estimated in the rule) and every service location has at least 2 taps where drinking water is consumed. The only way that there will be only a 20% pitcher filter customer use rate is if the programs are designed for 20% customer use, yet the proposed rule and economic analysis asserts that a pitcher filter program that reaches only 20% of the population provides “no unreasonable risk to public health.”

It is unacceptable for EPA to even imply that 20% customer protection is adequate to meet the standard of “no unreasonable risk to public health from the PFAS in the water during the period of the exemption.” Leaving 80% of the population unprotected by design is the definition of unreasonable risk to public health.

Finally, it must be noted that the proposed rule does not account for the unquantified risk of exposure to microbial contamination from filters stored outside a refrigerator, which would be necessary for residents to have easy access to filters when drinking water from a tap that is not located in the kitchen.

In the future, any time a public water system decides to use a POE or POU system as a SSCT, whether RO or pitcher filters, they would need to meet all the criteria of 40 CFR 141.100, “Criteria and procedures for public water systems using point of entry devices.” The interim pitcher filter control program does not meet any of these criteria which include each of the following:

- It is the responsibility of the public water system to operate and maintain the point of entry (POE) treatment system,
- The public water system must develop and obtain State approval for a monitoring plan before point-of-entry devices are installed for compliance,
- Effective technology must be properly applied under a plan approved by the State and the microbiological safety of the water must be maintained, and
- All consumers shall be protected.

2.1.4 Delay as an opportunity to allow POU RO treatment as a compliance option and POU RO cost estimate

According to the proposed rule, the delay will allow POU RO Units to become certified to the PFOS and PFOA MCLs, thus allowing them to be defined as SSCT for public water systems. US EPA (2024a) projects that POU RO will meet affordability criteria for systems serving 3,300 and fewer once a new NSF/ANSI certification standard that mirrors EPA’s regulatory standard is finalized. The proposed rule estimates that the cost savings for systems serving 500 or fewer choosing to install POU RO rather than currently available technologies are between 40 and 72 percent. Note that in order to use POU technology for compliance, these public water systems must meet the criteria in 40 CFR 141.100 described above.

The Technologies and Cost document for the 2024 PFAS NPDWR quantifies the time required to install, educate, and maintain a POU treatment program to meet the PFOS and PFOA MCLs (US EPA 2023, Table 7-5), but it does not publish any of the costs for RO devices or replacement parts. The time estimates appear reasonable on an average household basis. However, insufficient treatment unit cost data is provided to support the $327 – 357 estimated POU cost per household (US EPA, 2024a). It is entirely possible that devices that meet a future certification standard that mirrors or is more stringent than EPA’s regulatory standard would cost more and require replacement filters at a higher frequency than included in the 2024 POU Model cost estimate but information is not provided to independently assess the current or projected numbers (US EPA, 2023; US EPA 2024a).

The proposed rule assumes that POU RO treatment will become available as a compliance option during the two year exemption period, but 1) this is not a guarantee and 2) there are likely to be cost increases in final compliance costs compared to the undocumented cost estimate presented in the Technologies and Costs Document (US EPA, 2023).

2.1.5 POU RO treatment does not provide equivalent public health protection as a Best Available Technology

Just as the concern was raised that a pitcher filter program would not address all taps at a home where water is consumed, a long-term POU RO program with only one point of use device installed per home, implemented after NSF International/American National Standards Institute (NSF/ANSI) RO standards are updated to match the PFOS and PFOA MCLs, would also not address all water consumption at a home – just the tap where the device is installed. It leaves residents to continue to be exposed to contamination at other drinking water taps in the home. This would create two tiers of public health protection under the PFAS rules – communities with centralized treatment who can consume water anywhere in their house without concern of exposure, and communities where only one safe tap is available in the home and residents need to change all their daily living habits to get access to treated water when they need to consume water.

2.2 Are the temporary increased costs for compliance real?

2.2.1 Construction cost trends

Engineering News-Record (ENR) is the leading construction industry publication and has been publishing news and construction cost indices for more than 150 years. ENR reports that the nonresidential construction industry is in a period of high volatility, with significant cost increases beyond the typical annual trends in the past year. Construction material prices jumped 2.4% in May 2026, up 9.7% year on year, based on US Bureau of Labor Statistics Producer Price Index data (Gottlieb, 2026). The cost of electronic components has also increased recently, driven by increased lead times for semiconductor components which have reached 40 weeks as of early 2026 (Benjamin, 2026). Electronics are a critical part of control systems for pumps, dosing, and other water treatment applications, with delays in chip procurement resulting in cascading construction delays. Average hourly wages for construction workers rose 5.0% year on year, compared with 3.6% increase for the private sector overall (Gottlieb, 2026).

Volatility in costs can reduce owner confidence, resulting in delays to budget approvals and lengthening the preconstruction process. The industry is likely to face this volatility and uncertainty for the foreseeable future (Adolphus and Keller, 2026). Delaying construction does not guarantee that future PFAS improvement projects are more likely to be completed on time and/or within budget.

ENR produces a national construction cost index based upon labor (at a 20-city average rate) and a standard set of construction inputs including steel, cement, and lumber (ENR, 2026). Plotting this index from 2017 to 2026 (with 2026 end of year values extrapolated from July values) shows a steadily increasing trend at an average rate of 2.95% per year (Figure 2.1). The fit for this trend line is good (R^2 = 0.9738) and clearly shows that despite some shorter-term volatility (e.g. during the covid pandemic), a long-term increasing trend in construction costs can be expected. Despite the current volatility, it is therefore likely that construction costs will continue to rise. Based upon the rate of increase from 2017 to 2026, the projected construction cost index value in 2029 will be 9.6% higher than 2026. If the extended deadline of 2031 is considered, the index increases to 15.5% higher than today's construction costs.

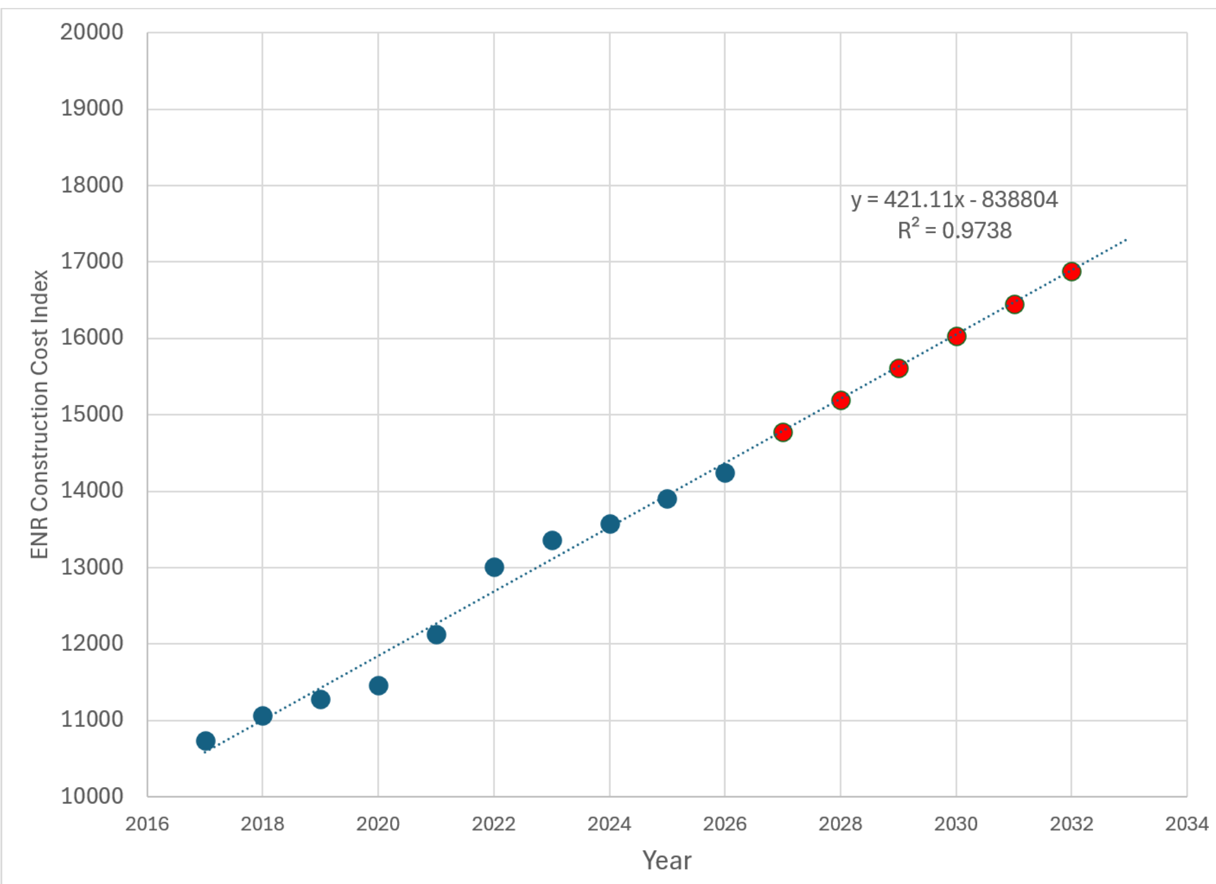

Figure 2.1. Historical and projected ENR Construction Cost Index (projected years in red based upon 2017 to 2026 trendline)

In summary, the construction industry cost data supports the statement in the preamble that there is ‘current evidence of escalating construction and equipment costs’. However, the construction industry cost data does not suggest that delaying construction by two years will result in significant cost savings. In fact, delaying may offset any savings in net present value because of ongoing cost increases. Uncertainty in the regulatory environment also drives costs higher and makes it harder to proceed with treatment improvements with confidence. Given the volatility in the construction industry, which the construction industry itself expects to persist for several years, it is feasible that delaying could actually increase the total cost.

2.2.2 Technology and innovation trends

The 2024 PFAS NPDWR listed four BATs for the six regulated PFAS compounds: granular activated carbon (GAC), anion exchange (AIX) resins, reverse osmosis (RO), and nanofiltration (NF). Other non-treatment options were also acknowledged as useful for compliance such as replacing a contaminated source water with another source. Conventional treatment is ineffective at removing PFAS.

The proposed rule cites treatment technology improvements and innovation as key factors to justify the delay, stating that ‘EPA expects that emerging technologies not previously designated as BATs will become better understood and may become more widely available’. PFAS removal technology is an active area of research and development within academia and industry and therefore advances are announced on a regular basis. There is no evidence in the scientific literature that a significant, ground-breaking shift in technology is about to emerge within the rule delay timeframe. As a basis for delay, the statement in the proposed rule implies that PWSs will choose to implement a treatment option that is not a BAT, which is unlikely for the majority of PWS given the wide availability of BAT options and the regulatory hurdles involved in gaining approval from state/primacy agencies for new technologies not identified as BATs.

The example technologies discussed include alternative sorbents and exchange media, separation methods such as foam fractionation, innovative destructive technologies, and powdered activated carbon (PAC).

Alternative sorbents include a number of engineered clay materials and porous organic polymers. These materials have tailored properties to enhance the selective removal of PFAS compounds, provide faster reaction kinetics, and extend operational lifespan when compared to traditional GAC (Burkhardt et al., 2025; Pannu, et al., 2023). Similarly, innovative ion exchange resins are under development to target PFAS compound removal. While promising for future applications, research published by staff from EPA ORD has concluded that 'significant work remains to refine these materials for large scale application' (Burkhardt et al., 2025).

Alternative sorbents could be fitted into standard GAC and AIX pressure vessels, which simplifies the design and integration into existing treatment plants. Depending on their specific chemical makeup, the novel sorbents and resins may require different or additional pretreatment steps, such as quenching of chlorine, removal of nitrate, or reduction in organic carbon. Most PFAS-selective AIX resins currently lack viable regeneration options for drinking water applications (Burkhardt et al., 2025).

Any new materials which are in contact with drinking water would require certification for chemical leaching (NSF/ANSI 61), with some states like California and New York having more stringent standards than national regulations and several states requiring pilot testing. NSF certification requires submission of an application with extensive materials data, testing performed by a third-party laboratory, a manufacturing facility audit, and review by NSF. This process can take 6 months or more, depending on the product complexity. This additional requirement is a further barrier to adoption of alternative adsorbents or AIX resins within the 2-year delay timeframe.

Some alternative adsorbents have received NSF/ANSI 61 approval, perform well in laboratory tests, and are available commercially (e.g. Flouro-Sorb https://www.mineralstech.com/cetco/water-and-remediation/fluoro-sorb-adsorbent) but these have yet to gain widespread use and build a significant full-scale history of successful operation. The costs of implementing these emerging technologies are not yet clear, as many are still in early stages of research and development (Burkhardt et al., 2025).

Given this overall situation, it is unlikely that a large number of affected PWS would benefit from advanced sorbents or ion exchange media during a 2-year delay. A select few, especially large systems with existing treatment challenges, might need to undertake the required pilot testing but those cases could be handled through existing extension and variance processes and do not necessitate a national exemption.

Foam fractionation was cited as an innovative technology for separation of PFAS in water. This technology uses bubbles with or without additional surfactants to attract and retain PFAS compounds within a foam layer at the top of a basin. It has been used to successfully reduce many of the PFAS long-chain compounds in field studies but could not provide full removal of selected short-chain PFAS so is unlikely to be implemented in drinking water as a primary PFAS removal technology without additional polishing processes like AIX or ozonation (Burns et al., 2021; Amen et al., 2023). This technology has recently emerged as a promising option for further concentration of PFAS in RO and NF concentrate, potentially providing a method for reducing the contaminated volume of water produced by RO/NF membrane processes down to 2% of feedwater volume (McCleaf et al., 2023). Used in this way, foam fractionation may facilitate the collection and handling of contaminated membrane concentrate for further treatment. RO and NF were included on the list of BATs in the 2024 PFAS NPDWR but were not included in the economic analysis as a feasible selection for utilities because of the disposal issues related to concentrate. While foam fractionation is a promising step in the right direction, it cannot eliminate the barrier to RO/NF use that is currently preventing widespread uptake of membranes for PFAS removal, especially by larger systems.

Advances in PFAS destruction technologies, such as electrochemical oxidation, plasma, thermal degradation, sonolysis, and supercritical water oxidation, are currently ongoing in the academic arena. High capital costs, high energy usage, limitations on scale of application, and formation of undesirable by-products are all major challenges for implementation of these technologies as full-scale primary PFAS removal, or even as residuals treatment technologies at this time (Meegoda et al, 2022). It is unlikely that research will advance sufficiently during the proposed 2-year delay to fundamentally alter the treatment landscape.

Powdered activated carbon is not an innovative treatment for PFAS and was discussed extensively in the 2024 NPDWR. PAC is a different form of GAC but behaves similarly in its PFAS removal efficiency. Given its powdered form, it can be added to existing processes (typically to the raw water or coagulation) without requiring construction of a dedicated tank or basin. However, adding this material generates additional solids that must be separated and disposed of, thereby transferring the PFAS contamination to the residuals and significantly increasing their volume (Alameddine et al., 2025). Many utilities already use PAC seasonally or temporarily to remove spikes in different contaminants but the 2024 PFAS NPDWR cited lack of operational PFAS data and the impact of other water quality parameters in its decision to not list PAC as a BAT. Research on the use of PAC has continued to demonstrate its effectiveness, and it is widely used, meaning that there is no need for a 2-year delay to further its implementation.

2.2.3 EPA's OUTreach, TEC and Real Water TA programs

EPA is providing technical assistance to water systems through the Real WaterTA program, which includes engineering support, as well as through the TEC and PFAS Out program (Real WaterTA). The latter two appear to be specific programs provided through the Real

WaterTA program. The budget and spending for these programs, as well as actual assistance provided to water utilities has not been clearly reported, but EPA has maintained a page summarizing Training and Technical Assistance for Small Systems Historical Funding (US EPA, 2024b).

In 2019 and 2020, these programs awarded $15 million per year, in the same range as they have for many years. This value increased to $22 million in 2022 and $30.7 million in 2023 when WaterTA first launched. Based on the historical funding levels prior to WaterTA, this funding history indicates that the resources put towards assisting water utilities through the WaterTA program is about $15.7 million a year. A new grant application opportunity was published in April, 2026 to continue this program at the same funding level for another fiscal year (US EPA, 2026e). The Real WaterTA program can provide PFAS compliance assistance, as well as the TEC program. The PFAS OUT program is primarily an education program that connects water systems with the Real WaterTA and TEC programs.

These programs are funded from year to year with no long-term commitment. Consequently, it is not a given that the Real WaterTA and its derivative programs will still be available during the two-year delay provided by the exemption, from April 2029 to April 2031.

A presentation from May of 2026 shows that the Real WaterTA program was able to assist 120 water utilities, presumably in one year (US EPA, 2026c). The TEC program was able to assist 22 active systems between June 2025 through February 2026. If funding levels remain consistent, as they have been since 2023, these programs are estimated to be capable of assisting a total of 284 water utilities during the two year exemption delay ((120+22)*2). This represents 6.6% of the mean 4,310 water utilities estimated to be required to comply with the PFOA and PFOS MCLs (Table 4-19 in US EPA, 2024c). The proposed rule delay will not allow the Real WaterTA, TEC, and PFAS Out programs to reach a substantial portion of those 4,310 water systems during the two year delay. Further, the scope of assistance provided is not clear. With limited public information, it is difficult to assess the success of this program and its delivery of services to water utilities struggling to comply with new requirements.

Based on the program description and the organizations receiving the Real WaterTA grants, the Real WaterTA program has access to the right skills and funding level adequate to provide effective assistance to the smaller number of challenged small systems that would be motivated to apply for the existing exemption process provided under SDWA. Based on past service delivery (US EPA, 2026c), Real WaterTA would need substantially more funding and long-term funding commitments to provide the envisioned design, financing, and compliance assistance to a significant number of water systems during the two-year exemption under the proposed rule.

3.0 Related Regulations

3.1 Sources of PFOS/PFOA

The Government Accountability Office (GAO) (2024) report 'Persistent Chemicals: Additional EPA Actions Could Help Public Water Systems Address PFAS in Drinking Water' noted that in their survey of PWSs in selected states with PFAS above the MCL, 90% of PWSs did not know the source(s) of PFAS contamination in their water.

Wastewater, both treated and untreated, remains a source of PFAS in drinking water if sources are impacted by wastewater discharges, which is the case for most surface waters. A recent review of wastewater treatment globally found that while legacy compounds like PFOA and PFOS remain present, short-chain PFAS compounds now dominate in influents, effluents, and sludge. Removal efficiencies were found to be negligible in conventional wastewater treatment and up to 86% of the total organic fluorine present in the samples was related to untargeted compounds (Liu and Charbonnet, 2025).

However, the detection frequency of PFAS compounds from groundwater sources was more than twice that from surface water sources in a study using UCMR3 data (Hu et al., 2016). It is significantly more challenging to identify and trace contamination plumes in underground aquifers than it is to do in surface water sources. Historical discharges that resulted in groundwater contamination, such as those from military fire training sites and airports using fire-fighting foams, would not be affected by the most recent ELGs. A study in the Cape Fear, NC river basin modeled past and future PFAS concentrations in groundwater discharges to the river. This study demonstrated that little retardation or degradation was occurring in groundwater, with compounds up to 43 years old being detected, meaning that historical contamination was likely to remain present until 2050 or 2060 (Jensen, et al., 2024). This movement of contamination plumes through groundwater aquifers could also mean that drinking water sources which are currently low in PFAS could see elevated source water concentrations in the future.

Further, there has always been a disconnect between effluent discharges and drinking water monitoring. Under the PFAS rule, quarterly sampling is the most frequent monitoring schedule required for surface water systems. Meanwhile, the PFAS content of industrial discharges can change by the hour. There is no requirement for surface water systems to sample for PFAS contaminants during peak discharges, and mandatory sampling frequency – quarterly – will never capture the variation of ongoing discharges and their overall impact on drinking water concentrations and public health impacts.

3.2 Impact of Hazard Index rollback and potential future PFAS MCLs

Every time incremental requirements are added to existing public water systems, like the hazard index or additional PFAS MCLs, additional assessments, evaluations, and potentially design and construction costs must be incurred to comply. In the end, new treatment may not be required, but every water system must go through the evaluation process to make this determination, and the evaluation process requires expertise, time, and money. The most cost-efficient way to design water treatment is to have all the MCLs and requirements known at the time of design. It will never save money to design compliance treatment systems in two separate steps. As identified at the July 2025 NDWAC meeting, “unclear targets or changing PFAS MCLs may increase costs for systems due to redesigns or needed upgrades” (US EPA, 2025).

4.0 Water system capacity

4.1 Does the proposed rule accurately capture business processes at water utilities?

The majority of water utilities are publicly owned and therefore must follow appropriate procurement processes. From identifying a capital need such as a requirement to remove PFAS, a typical process for a municipal treatment process improvement project would entail:

1. Obtain engineering / design contract which includes determining requirements and developing call for proposals, advertising for at least 1 month, reviewing proposals, conducting interviews, selecting winning proposal, negotiating contract, having contract approved - minimum 3 months, often 6 months up to 1 year.
2. Perform preliminary design (30%) to select technology, determine preliminary sizing, develop sufficient details for a Class 3 or 4 cost estimate with –15% to +50% accuracy (AACE, 2020) - minimum 3 months, often 6 months.
3. Obtain budget approval, apply for funding based on preliminary design – minimum 1 month, as long as several years depending on funding sources and requirements
4. Proceed with detailed design (90 – 100%) to finalize details and develop a Class 1 cost estimate with –3% to +15% accuracy (AACE, 2020) - minimum 3 months, often 6 months depending on complexity

5. Approval and acceptance of final design – minimum 1 month, depending on internal reviews required
6. Advertise project for construction which includes determining requirements and developing call for proposals, advertising for at least 1 month, reviewing proposals, conducting interviews, selecting winning proposal, negotiating contract, having contract approved - minimum 3 months, often 6 months up to 1 year.
7. Conduct the construction – 6 months to 1 year, depending on complexity, equipment lead times, and seasonal conditions.
8. Final inspections, develop operations manuals, and related commissioning – 1 month to several months, depending on complexity.

Based on this outline, a straightforward project performing each step quickly and efficiently could be finished and operational in 20 months. On the higher end for large systems with significant internal governance and procurement processes, plus complex construction requirements to modify existing treatment plants while remaining fully operational, several years would likely be required to complete the improvements.

For small systems, especially non-community systems that would not be governed by the same procurement requirements, and that might only require a large point-of-entry packaged treatment system that can be provided and installed by a single supplier, many of these procurement steps will not be necessary and the installation could be completed in a few months.

The proposed rule cites supply chain disruptions which could delay delivery of specialized treatment equipment along with procurement uncertainty due to volatility in construction materials markets as compelling factors to warrant a 2-year delay. As of mid-2026, there are 3 years remaining before the 2024 PFAS NPDWR would come into effect. Based on the procurement and construction timelines presented here, all but the largest and most complex projects should be feasible to complete within 3 years if started right now. For those few PWSs with more complex projects, sufficient work should be underway within 3 years to narrow the uncertainties around procurement and to provide justification for an individual extension or variance, without the need for the proposed exemption program. The promulgation of the PFAS Delay rule might in fact generate further uncertainty within the procurement process with detrimental effects on construction costs and speed of installation.

According to the preamble, “The EPA proposes to find that, for some water systems that exceed the MCLs, management and restructuring changes supporting the ability of the system to install and use advanced treatment, such as rate increases and new system operators and owners, cannot reasonably be made in time to result in compliance with the

MCLs by the current compliance date. Similarly, the state capacity development programs, that small and disadvantaged systems frequently participate in, also can take several years to effect significant results and would not be able to reasonably impact compliance with the MCLs." While this finding may be true for a subset of water utilities, it does not justify the broad exemption opportunity proposed in this rule. The existing authority under SDWA is sufficient to meet the need described in this discussion.

4.1.1 Timing for mergers, connections, and purchase agreements with neighboring utilities

As with all things, when there is political will, all the management and restructuring changes can happen with astonishing speed. For example, in July 2018 the municipal wells for the City of Parchment, Michigan were found to contain PFAS concentrations above the EPA health advisory level then in effect. A do not drink advisory was issued. The contaminated wells were shut down. In just 21 days, three permanent water connections were designed, permitted, and constructed (Prein and Newhof, 2026). Additional homes were added to extended water mains with the extension project finished within three years.

Another example is the city of Newburgh, New York. PFAS contamination was identified in its 2014 Annual Water Quality Report, published in May 2015. New York transitioned the city to a clean alternative drinking water supply in May 2016, and then to New York City's Catskill Aqueduct in June 2016 (NYDEC, n.d.).

The City of Airway Heights in Washington found three wells had PFAS concentrations greater than 70 ppt in May 2017. The City secured an interconnection with the City of Spokane and the water was declared safe to drink as of June 2017 (CDC ASTDR, n.d.).

Examples like these prove that these processes are only drawn out over five or more years when no one is willing to take action to protect public health and they use narratives such as those provided in the preamble as justification for delaying or taking no action.

4.1.2 Cost and timing of operator training

The proposed rule uses a lack of qualified operators and lack of training as justification for providing the option of a two-year exemption. However, without a fundamental restructuring and funding of operators and operator training, there is no reason to expect a different outcome in operator readiness two years from now compared to current practice. The only thing that will make a change to the availability of qualified and well trained operators is a real, enforceable requirement that water utilities must meet. Delaying the requirement delays the urgency of the training. It does not make training any more available or anyone more ready to perform the job.

4.2 Filter distribution and public education program considerations

As discussed in section 2.1.3, the cost of implementing a pitcher filter distribution and education program is substantially more both in cost and in effort than the program quantified in the proposed rule economic analysis. An effective program requires not just the money to pay for filters, but personnel and data systems to carry it out. It is far more hands-on and interactive than typical water utility work, frequently outside the comfort zone of operators and engineers. A realistic list of the steps that must be taken to implement an effective filter distribution program that protects public health can be found in section 2.1.3.

This interim pitcher filter delivery program will also be an extra burden because it can only be short term – pitcher filters are not contemplated as a SSCT for small water systems, only POU RO devices are considered. As described in section 2.1.3, a comprehensive program must be developed per 40 CFR 141.100 to use POU or POE devices for compliance. This means effectively duplicating and expanding the POU compliance effort after the two-year extension is complete if a water system using pitcher filters is ultimately able to use POU RO for compliance.

According to the 2024 NPDWR PFAS Economic Analysis (US EPA, 2024c) an average of 4,310 public water systems are anticipated to exceed the PFOS and/or PFOA MCL. According to the Proposed Rule Economic Analysis (US EPA, 2026d), a total of 993 public water systems are expected to require interim control measure requirements under the proposed rule. This means that about 75% of water systems that are estimated to exceed the PFOS and PFOA MCLs have detected levels in their water system less than 12 ppt and will not need interim treatment to comply with the proposed exemption option. This fact, plus the fact that interim control measures are not required to meet the MCLs, means that all consumers in water systems that receive an exemption will suffer the foregone benefits of the proposed rule.

The water systems with the greatest risk of exposure, with PFOS and/or PFOA levels greater than 12 ppt, would be required to complete extra work under this rule to distribute filters while designing long term treatment programs. The interim measures create added complexity for water systems that need to focus most on advanced treatment, blending, or relationships with other utilities. The interim control measures add no public health benefit for 75% of water systems that do not meet the PFOS and PFOA MCLs, nor for the 80% of customers assumed to not use pitcher filters per the quantified pitcher filter control program.

Rather than delay implementation deadlines, EPA should increase the capacity development and funding programs while keeping compliance deadlines tight to create the political will for water systems to install treatment on efficient schedules to protect public health as quickly as possible.

5.0 Funding

5.1 Overview and quantification of financial assistance currently available

5.1.1 Federal programs

As of August 2025, the IIJA appropriated $43.5 billion for water infrastructure using the Drinking Water State Revolving Fund (DWSRF) program administered by EPA (Water Finance and Management, 2025). This included $11.7 billion for the DWSRF general fund plus $4 billion for emerging contaminants, at $800 million per year for 5 years (US EPA, 2026a). There is an additional $5 billion appropriated for the Emerging Contaminants (EC) in Small or Disadvantaged Communities Grant (SDC), and the final 2026 allotment was announced in May, 2026 (Kramer, 2026). Water systems can also use the Water Infrastructure Finance and Innovation Act (WIFIA) Program to leverage and access water infrastructure funding (US EPA, 2020).

The IIJA expires in September 2026, at exactly the time when water utilities need it to fund treatment installation to meet the new PFOS and PFOA MCLs. The larger SRF funding allotment is available for PFAS compliance, but it is not entirely designated for this purpose. The amount of the larger DWSRF funding pool that is going specifically toward PFAS treatment is unavailable.

It is important to note that since 2021 Congress has begun earmarking SRF appropriations and distributed them as grants instead of loans. The program was designed primarily as a self-sustaining loan and payback system, rather than a continuous infrastructure grant program with new funding that becomes available every year to cover infrastructure costs that are known to never end. When awarded as grants, money is not paid back to replenish the SRF program. As a result, states will experience a net loss of $19.4 billion and 39 states will lose more money than they gain with an average loss of $550 million each (Pritchard et al., 2026). Even though DWSRF funds appear to be available currently, real access to this and future funding is decreasing substantially as a result of earmarks.

Although EPA states "EPA anticipates there are likely to be additional available funds during the period of the exemption," the FY 2027 Trump administration budget request would reduce the Drinking Water SRF funding by 90 percent, from $1.1 billion in total DWSRF obligations in FY 26 to $150 million in FY 27, stating that states should assume greater responsibility for financing their own water infrastructure projects (US EPA, 2026b). This significant decrease in funding will continue to make compliance with the PFAS MCLs more and more difficult as compliance dates are extended. Recent funding announcements merely take credit for the final allotments of the IIJA money and do not represent additional funding above what was already allocated (US EPA, 2026e).

The proposed rule also notes that funding is also available via United States Department of Agriculture (USDA) Rural Development. This most likely refers to the USDA Rural Development Water & Waste Disposal Program, although specific funding levels are difficult to obtain (USDA, 2026). While this money is eligible for PFAS treatment, it covers a much larger range of projects including all drinking water and wastewater infrastructure. The FY 27 budget request could not be located to explore the extent of future funding.

As stated at the July 2025 National Drinking Water Advisory Council (NDWAC) meeting, IIJA money will only be available through 2026 (US EPA, 2025). Any added delay or compliance date uncertainty may cause some systems to put off improvements until the time when the money has run out. Further, some states require an MCL exceedance to qualify for funding to install treatment (US EPA, 2025). In these cases, the sooner the MCLs become effective, the better for water utilities searching for funding to comply. The proposed two-year exemption does not benefit water systems seeking funding for PFAS treatment installation and is not guaranteed to make funding more available.

This projection was confirmed in Water Finance and Management, that reported that award volumes have declined during 2025 due to “a combination of executive orders, staffing reductions, and uncertainty over emerging contaminant regulations” (Water Finance and Management, 2025). In other words, this proposed rule creates uncertainty that is contributing to the slowdown in financial awards and delaying some decisions past the availability of the funding program implemented to address this need.

5.1.2 State Funding and Legal Settlements

State funding programs exist in addition to federal funding, but it is difficult to separate these appropriations from the DWSRF because DWSRF awards are allocated through state programs. In addition, substantial funding for these programs comes from legal settlements. Settlement funds also go to environmental remediation and contaminated private wells. Just like DWSRF funding, it is difficult to quantify the specific amount available for compliance with the PFAS regulations. There is no comprehensive location tracking these funding sources, examining ultimate allocation of resources, and determining whether settlement money actually goes towards the impacted populations.

Examples of state funding programs include:

- Minnesota, where $700 million of a legal settlement from 3M is dedicated to drinking water projects (Minnesota Department of Natural Resources, 2026)
- Ohio is distributing $65 million from a settlement with DuPont to fund drinking water projects (Cossin, 2026).
- Wisconsin released more than $133 million to fight water contamination from PFAS substances in 2026 (Spears, 2026)
- New York announced $453 million for water infrastructure and intermunicipal water grant programs in 2025 (Hochul, 2026)
- Michigan appropriated $25 million in 2019 for a grant program for contaminant remediation efforts, connection to an alternate system, as well as to invest in technologies to address contaminants in public water systems (Michigan Department of Environment, Great Lakes, and Energy, 2020).

Even though the Trump administration asks states to step up their funding efforts, there appears to be many states that are not allocating additional resources for treatment to meet the new PFAS MCLs.

Not all settlement funds are guaranteed to go to the impacted communities. A pending settlement with Chemours does not provide any direct or guaranteed funding for the drinking water treatment necessitated by their years of contamination and inadequate water treatment. The Cape Fear Public Utility Authority has spent more than $92 million to remove PFAS from drinking water since 2017 (Hoban and Atwater, 2026).

Even though settlement dollar values appear significant, there is no systematic effort to align settlements with drinking water treatment needs, no systematic effort to ensure dollar values are sufficient to meet treatment requirements necessitated by polluters, and no guarantee that settlement funds will actually go to impacted communities and their water utilities. Counting on settlements to cover the cost without providing structure and requirements will not achieve the funding goals outlined in the proposed rule.

6.0 POU/POE Treatment

Current certification for POU and POE devices focuses on compliance with NSF/ANSI Standard 53 for Drinking Water Treatment Units and Standard 58 for Reverse Osmosis Systems. The current standard requires removal of regulated PFAS compounds to a concentration of 20 ppt. The NSF website notes that work is currently underway to update Standards 53 and 58 to align with the 2024 NPDWR MCL values but no timeline is given for those standards to be complete, balloted to the NSF Joint Committee and Public Health Council, then finally incorporated as official updates (NSF, 2026). When the updated procedure is ready, the balloting and final issuance of new standards can be done within a few months but often the standards are only updated once per year. Overall, the entire update procedure can take 1 to 2 years for more complex standards like PFAS.

Several studies in the academic literature have examined the ability of currently available POU devices to remove sufficient PFAS compounds to meet the MCLs, with a focus on RO (generally undersink installation) and GAC or GAC plus AIX (generally filter pitchers but also undersink block filters) types of treatment. Many have evaluated PFAS beyond the currently regulated compounds to get a wider picture of public health implications (Teymoorian et al., 2024; Herkert et al., 2020). The results of these studies demonstrate that while all devices provide some removal, there are clear differences in the extent of removal and ability to reach very low concentrations near the MCLs.

For pitcher filters used during the proposed two-year exemption period, Teymoorian et al. (2024) showed that the combination GAC with AIX pitcher filters (brand name ZeroWater) removed more than 99% of 75 PFAS compounds to achieve near zero ppt in two different tap waters with total PFAS ranging from 63 to 8 ppt. Another GAC pitcher filter product (brand name ClearlyFiltered) produced a similarly low total PFAS concentration for the 75 compounds tested. Standard Brita and Elite Brita pitchers performed less well, with removals ranging from 20 to 48% across the two different tap waters. Neither filter effluent achieved the target PFOS and PFOA MCL values of 4 ppt. Heckert et al. (2020) confirmed that many GAC POU filter pitchers were not as effective at removing PFAS, especially the short-chain compounds. The studies presented here demonstrate the importance of testing pitcher filters to find a filter that performs well in a specific water quality before buying in bulk and distributing to the community, much like Denver did when they selected pitcher filters for their lead reduction program (Corona Environmental Consulting, 2019).

The 2024 PFAS Economic Analysis (US EPA, 2024c) contemplates only POU RO as being used as an SSCT under the final PFAS NPDWR. RO options, which include POU and POE applications, provide a much higher percentage removal of all PFAS compounds (Heckert et al., 2020). These products would also be capable of meeting the MCLs although their cost is significantly higher than for filter pitchers and installation in homes would pose logistical challenges for PWS to implement. However, installation would be required for POU RO systems to be used for compliance purposes (see 2.1.3).

In summary, there are products currently available that meet the PFOS and PFOA MCLs of 4 ppt, but use of these products is not required in the proposed rule. Consumers and/or public water systems will not be easily able to find these products because certification and performance data are not readily available, and filters can provide different removal efficiencies in different water qualities. Consumers could mistakenly believe that the current POU certification (for removal to 20 ppt) provides adequate protection.

7.0 Conclusions

This memo has presented a review of several key aspects within the proposed rule including costs, advanced treatment technologies, the impact of related regulations, water system capacity, funding, and POU/POE devices. Based on this analysis, the two-year exemption process is not required, especially given that there is an existing exemption process available in the SDWA. The proposed rule represents real costs in terms of money and effort with unclear or non-existent benefits from a water system implementation perspective.

As another way of considering the implications, water systems can be broadly characterized into several groups based on their anticipated reactions to the proposed rule, as follows:

1. Most likely to apply for the proposed two-year exemption:
    - Systems that would have applied for exemptions under the existing SDWA process, including:
        - Systems with low PFOS and PFOA levels in challenging source water that necessitate additional monitoring and pilot studies that draw out the compliance timeline.
        - Systems with difficult funding processes and timelines that limit installation according to the original rule deadlines.
        - Systems that have already begun implementing improvements and are legitimately facing delays in procurement and construction due to unforeseen circumstances.
    - Systems that make treatment decisions based only on cost minimization and who are betting on costs decreasing over time.
2. Ineligible to apply for the two-year exemption or highly unlikely to apply for the exemption:

- Water systems in states that have already applied for primacy, like Illinois and Idaho, and those anticipated to apply for primacy due to state adoption of the PFAS MCLs (e.g., Maine, Vermont, Wisconsin, and New York).
- Systems that make treatment decisions using public health protection or risk reduction as their primary drivers. These include all the water systems that have already installed treatment, even in states that do not yet have PFAS MCLs.
- Systems that make treatment decisions based only on cost minimization and who anticipate costs to keep increasing over the additional two years.
- Systems that do not take action to comply with any new requirements until they are faced with a violation.
- Systems with PFOS and/or PFOA greater than 12 ppt that want to go straight to long term implementation and do not want additional administrative or logistical steps to work through in the short term while they are working on long term solutions.

From this perspective, the proposed rule therefore only addresses the systems who are not proactively seeking treatment for PFAS and who would wait for a violation to occur before acting. For all other systems, the proposed rule adds uncertainty and additional work that distracts them from efforts to comply with the PFAS MCLs.

8.0 References

AACE. (2020). 18R-97: Cost Estimate Classification System – As Applied in Engineering, Procurement, and Construction for the Process Industries. https://web.aacei.org/docs/default-source/toc/toc_18r-97.pdf

Adolphus, E., & Keller, J. (2026, May 20). Top 400 Contractors Hit Craft Ceiling as AI Boom Strains Skilled Labor Resources | Engineering News-Record. https://www.enr.com/articles/63029-top-400-contractors-hit-craft-ceiling-as-ai-boom-strains-skilled-labor-resources

Alameddine, M., Liu, Z., Sauvé, S., & Barbeau, B. (2025). Comparative Assessment of Powdered versus Granular Activated Carbon for PFAS Removal in Drinking Water Treatment Plants. ACS ES&T Water, 5(2), 851–861. https://doi.org/10.1021/acsestwater.4c00901

Amen, R., Ibrahim, A., Shafqat, W., & Hassan, E. B. (2023). A Critical Review on PFAS Removal from Water: Removal Mechanism and Future Challenges. Sustainability, 15(23), 16173. https://doi.org/10.3390/su152316173

American Water Works Association. (2026). 2026 State of the Water Industry. https://www.awwa.org/state-of-the-water-industry/

Benjamin, S. (2026, June 22). 5 Common Electronics Manufacturing Bottlenecks (and How to Fix Them). Accuris. https://accuristech.com/blog/blog-electronics-manufacturing-bottlenecks/

Betanzo, E. W., Pinkney, E., & Land, D. (2023). Benton Harbor: From Lead Crisis to Lead-Free. Journal AWWA, 115(7), 30–39. https://doi.org/10.1002/awwa.2141

Betanzo, E. (2023). Analysis of the USEPA Proposed PFAS National Primary Drinking Water Regulation Treatment Costs and Comparison to the AWWA National PFAS Cost Model Report.

Bosscher, V., Lytle, D. A., Schock, M. R., Porter, A., & Del Toral, M. (2019). POU water filters effectively reduce lead in drinking water: A demonstration field study in Flint, Michigan. Journal of Environmental Science and Health, Part A, 54(5), 484–493. https://doi.org/10.1080/10934529.2019.1611141

Burkhardt, J., Speth, T. F., Gorzelnik, S., Gorzalski, A. S., Coronell, O., El-Khattabi, A. R., & Ateia, M. (2025). How Do Novel PFAS Sorbents Fit into Current Engineering Paradigm? ACS ES&T Engineering, 5(4), 830–838. https://doi.org/10.1021/acsestengg.5c00036

Burns, D. J., Stevenson, P., & Murphy, P. J. C. (2021). PFAS removal from groundwaters using Surface-Active Foam Fractionation. Remediation Journal, 31(4), 19–33. https://doi.org/10.1002/rem.21694

CDC ATSDR. (n.d.). PFAS Exposure Assessment Airway Heights, Spokane County, WA. Retrieved July 10, 2026, from https://www.atsdr.cdc.gov/pfas/docs/factsheet/Spokane-Factsheet-508.pdf

Congressional Research Service (CRS). (2026, June 23). EPA’s PFAS Drinking Water Regulation: Considerations for Congress. https://www.everycrsreport.com/reports/R49007.html

Corona Environmental Consulting. (2019). Pitcher Filter Challenge Testing for Lead and Fluoride Removal.

Cossin, A. (2026, April 15). Ohio begins distributing $65M in PFAS settlement funds to impacted communities. WaterWorld. https://www.waterworld.com/drinking-water-treatment/pfas/news/55371041/ohio-begins-distributing-65m-in-pfas-settlement-funds-to-impacted-communities

Denver Water. (2024, August 9). DENVER WATER LEAD REDUCTION PROGRAM SEMI-ANNUAL REPORT – 2024. https://www.denverwater.org/sites/default/files/lead-reduction-program-semi-annual-report-2024.pdf

Echeverria, M. (2025). Primacy Extension Request Documents for the 2024 Control of Per- and Polyfluoroalkyl Substances National Primary Drinking Water Regulation.

Engineering News-Record (ENR). (2026). Construction Cost Index History—As of July 2026. Retrieved 9 July 2026, from https://www.enr.com/economics/historical_indices/construction_cost_index_history

Gottlieb, B. (2026, November 6). Construction Materials Prices Jump 2.6% in May, Up Nearly 10% Year Over Year. Engineering News-Record. https://www.enr.com/articles/63148-construction-materials-prices-jump-26-in-may-up-nearly-10-year-over-year

Herkert, N. J., Merrill, J., Peters, C., Bollinger, D., Zhang, S., Hoffman, K., Ferguson, P. L., Knappe, D. R. U., & Stapleton, H. M. (2020). Assessing the Effectiveness of Point-of-Use Residential Drinking Water Filters for Perfluoroalkyl Substances (PFASs). Environmental Science & Technology Letters, 7(3), 178–184. https://doi.org/10.1021/acs.estlett.0c00004

Hoban, R., & Atwater, W. (2026, June 25). Chemours looks to settle federal PFAS case for $450 million. NC wasn't at the table. North Carolina Health News. https://www.northcarolinahealthnews.org/2026/06/25/chemours-pfas-settlement-nc-excluded/

Hochul, K. (2026). Governor Hochul Announces More Than $453 Million in Grants to Make Local Water Infrastructure Improvements Affordable Statewide. Retrieved July 2, 2026, from https://www.governor.ny.gov/news/governor-hochul-announces-more-453-million-grants-make-local-water-infrastructure-improvements

Hu, X. C., Andrews, D. Q., Lindstrom, A. B., Bruton, T. A., Schaider, L. A., Grandjean, P., Lohmann, R., Carignan, C. C., Blum, A., Balan, S. A., Higgins, C. P., & Sunderland, E. M. (2016). Detection of Poly- and Perfluoroalkyl Substances (PFASs) in U.S. Drinking Water Linked to Industrial Sites, Military Fire Training Areas, and Wastewater Treatment Plants. Environmental Science & Technology Letters, 3(10), 344–350. https://doi.org/10.1021/acs.estlett.6b00260

Jensen, C. R., Genereux, D. P., Solomon, D. K., Knappe, D. R. U., & Gilmore, T. E. (2024). Forecasting and Hindcasting PFAS Concentrations in Groundwater Discharging to Streams near a PFAS Production Facility. Environmental Science & Technology, 58(40), 17926–17936. https://doi.org/10.1021/acs.est.4c06697

Kramer, J. (2026). Allotments of FY 2026 Infrastructure Investment and Jobs Act (IIJA) Appropriations for the Emerging Contaminants (EC) in Small or Disadvantaged Communities (SDC) Grant, Authorized under Section 1459A(a)(j) of the Safe Drinking Water Act.

Liu, J., & Charbonnet, J. A. (2025). A Critical Review of PFAS Analysis, Occurrence, and Fate in Wastewater Treatment Plants. Environmental Science & Technology, 59(48), 25492–25517. https://doi.org/10.1021/acs.est.5c09949

McCleaf, P., Stefansson, W., & Ahrens, L. (2023). Drinking water nanofiltration with concentrate foam fractionation—A novel approach for removal of per- and polyfluoroalkyl substances (PFAS). Water Research, 232, 119688. https://doi.org/10.1016/j.watres.2023.119688

Meegoda, J. N., Bezerra de Souza, B., Casarini, M. M., & Kewalramani, J. A. (2022). A Review of PFAS Destruction Technologies. International Journal of Environmental Research and Public Health, 19(24), 16397. https://doi.org/10.3390/ijerph192416397

Michigan Department of Environment, Great Lakes, and Energy. (2020). C2R2 Grant Overview. https://algomatwporg.civicweb.net/document/30775/

Minnesota Department of Natural Resources. (2026). 3M PFAS Settlement Priority 2 Grant Program. https://www.dnr.state.mn.us/grants/3mp2.html

National Drinking Water Advisory Council. (2023). Report of the Microbial and Disinfection Byproducts Rule Revisions Working Group. https://www.epa.gov/system/files/documents/2023-11/report-of-the-mdbp-rule-revisions-working-group-to-the-ndwac-november-2023_0.pdf

NSF. (2026). PFAS in Drinking Water. https://www.nsf.org/consumer-resources/articles/pfas-drinking-water

NYDEC. (n.d.). Newburgh—NYSDEC. Retrieved July 10, 2026, from https://dec.ny.gov/environmental-protection/site-cleanup/regional-remediation-project-information/region-3/newburgh

Pannu, M. W., Chang, J., Medina, R., Grieco, S. A., Hwang, M., & Plumlee, M. H. (2023). Comparing PFAS removal across multiple groundwaters for eight GACs and alternative adsorbent. AWWA Water Science, 5(3), e1345. https://doi.org/10.1002/aws2.1345

Prein and Newhof. (2026). Kalamazoo Water System Extensions. Retrieved July 2, 2026, from https://www.preinnewhof.com/pn-projects/water-system-extensions/

Pritchard, J., Patel, E., & Schmidt, D. (2026, March). Revolving No More: How Earmarks Are Draining America's Water Funds. https://static1.squarespace.com/static/611cc20b78b5f677dad664ab/t/69dd290247fe6c044b5ba9c5/1776101635019/Revolving+No+More_How+Earmarks+Are+Draining+America%E2%80%99s+Water+Funds.pdf

Spears, B. (2026, April 7). Gov. Tony Evers signs bills releasing money to combat PFAS contamination. Wisconsin Examiner. https://wisconsinexaminer.com/2026/04/07/gov-tony-evers-signs-bills-releasing-money-to-combat-pfas-contamination/

Teymoorian, T., Dinh, Q. T., Barbeau, B., & Sauvé, S. (2024). Performance of pitcher-type POU filters for the removal of 75 PFAS from drinking water: Comparing different water sources. Frontiers in Environmental Chemistry, 5. https://doi.org/10.3389/fenvc.2024.1376079

Tully, J., Schock, M., Shilling, S., Bosscher, V., Lytle, D., Harmon, S., & Bennett-Stamper, C. (2024). An evaluation of properly operated NSF/ANSI-53 Pb certified drinking water filters in Benton Harbor, MI. https://iwaponline.com/jwh/article/22/2/296/99992/An-evaluation-of-properly-operated-NSF-ANSI-53-Pb

USDA. (2026). Water and Waste Disposal Systems for Rural Communities. Retrieved July 2, 2026, from https://sam.gov/fal/cb6164a2e1e947aa91197e411fef27ad/view

US EPA. (2006, January 4). National Primary Drinking Water Regulations: Stage 2 Disinfectants and Disinfection Byproducts Rule. Federal Register. https://www.federalregister.gov/documents/2006/01/04/06-3/national-primary-drinking-water-regulations-stage-2-disinfectants-and-disinfection-byproducts-rule

US EPA. (2019, June 11). National Enforcement and Compliance Initiative: Increasing Compliance with Drinking Water Standards at Community Water Systems [Overviews and Factsheets]. https://www.epa.gov/enforcement/national-enforcement-and-compliance-initiative-increasing-compliance-drinking-water

US EPA. (2020, February 10). About the WIFIA Program [Collections and Lists]. https://www.epa.gov/wifia/about-wifia-program

US EPA. (2023). Technologies and Costs for Removing Per- and Polyfluoroalkyl Substances (PFAS) from Drinking Water (EPA-822-P-23-011).

US EPA. (2024a). Best Available Technologies and Small System Compliance Technologies for Per- and Polyfluoroalkyl Substances (PFAS) in Drinking Water (815R24011).

US EPA. (2024b, April 24). Training and Technical Assistance for Small Systems Historical Funding [Announcements and Schedules]. https://www.epa.gov/dwcapacity/training-and-technical-assistance-small-systems-historical-funding

US EPA. (2024c). Economic Analysis for the Proposed Per- and Polyfluoroalkyl Substances National Primary Drinking Water Regulation (EPA-822-P-23-001).

US EPA. (2024d). Economic Analysis for the Final Lead and Copper Rule Improvements (EPA 810-R-24-005).

US EPA. (2025, July 28). U.S. Environmental Protection Agency National Drinking Water Advisory Council (NDWAC) Virtual Public Meeting (EPA-HQ-OW-2025-1742-0059).

US EPA. (2026a). Clean Water and Drinking Water State Revolving Funds and the Bipartisan Infrastructure Law. https://www.epa.gov/system/files/documents/2022-03/national-webinar_srf-bil-presentation.finalrev.pdf

US EPA. (2026b). FY 2027 EPA Budget in Brief. https://www.epa.gov/system/files/documents/2026-04/00_fy-2027-bib_combined_final.pdf

US EPA. (2026c, May). U.S. EPA Real Water Technical Assistance (RealWaterTA): Accomplishments and Success Stories. https://www.chesapeakebay.net/files/documents/RealWaterTA-Outreach.pdf

US EPA. (2026d). Economic Analysis for the Proposed Rule Extending the Compliance Date for the PFOA and PFOS Maximum Contaminant Levels.

US EPA. (2026e). Training and Technical Assistance to Improve Water Quality and Enable Small Public Water Systems to Provide Safe Drinking Water Funding Opportunity Number: EPA-OW-OGWDW-26-01. https://files.simpler.grants.gov/opportunities/1d65b332-461a-4546-820c-293b955f86ac/attachments/852ff0a3-5062-4b81-bb69-73c1b30a3d9b/EPA-OW-OGWDW-26-01_Revised_2026_04_30.pdf

US EPA. (2026f). SDWIS Fed 2026 Q2 Water System Detail Inventory.

US Government Accountability Office. (2024). Persistent Chemicals: Additional EPA Actions Could Help Public Water Systems Address PFAS in Drinking Water (GAO-24-106523). https://www.gao.gov/assets/gao-24-106523.pdf

Water Finance & Management, C. (2025, August 25). Mapping the Progress of IIJA Funding for Water Infrastructure. https://waterfm.com/mapping-the-progress-of-iija-funding-for-water-infrastructure/

Elin Warn Betanzo, PE

Elin created Safe Water Engineering, LLC in 2017 to improve access to safe drinking water through engineering and policy consulting after helping uncover the Flint Water Crisis. Elin has over 20 years of experience in the water industry, working for the U.S. Environmental Protection Agency, water utilities, think tanks, and as a private consultant.

She was appointed to the U.S. Environmental Protection Agency's National Drinking Water Advisory Council and the Michigan Corrosion Control Panel, and she has been recognized by the Senate Environment and Public Works Committee as a national expert in drinking water policy.

Education
- Great Lakes Leadership Academy, Emerging Leaders Program, 2021
- MS, Environmental Engineering, Virginia Polytechnic Institute and State University, 2004
- BS, Environmental Science, Carnegie Mellon University, 1999
- BFA, Piano Performance, Carnegie Mellon University, 1998

Certifications
Professional Engineer in Michigan, Virginia, and Maryland

Certified Water Distribution S-3 Operator in Michigan

SKILL SUMMARY

- National and state science and policy leader regarding regulated drinking water utilities.
- State and national policy leader and technical advisor on school drinking water quality issues.
- Recognized expert for explaining water issues in local, state, national, and international media.
- Trust builder skilled in education, transparency, and engagement within communities and the water utility sector.
- Consensus building and collaboration team leader for multidisciplinary and intergovernmental workgroups.
- Technical expert on drinking water regulatory compliance for public water systems, government agencies, schools and community groups at the city, county, state, and federal levels.
- Experienced engineer with asset management, plan review, infrastructure and regional planning skills.

EXPERIENCE

Safe Water Engineering, LLC; Detroit, MI
2017 – present

President and Founder. Most relevant clients and projects follow.

- **The Joyce Foundation.** Third-party monitoring and evaluation of the Benton Harbor, MI lead service line replacement program. Trained community members to observe lead service line replacement to ensure public health protection and compliance with contract provisions. Reviewed monthly operating reports and public notification documents to ensure compliance with the Safe Drinking Water Act. The project resulted in the successful replacement of all lead service lines and confirmation of non-lead service lines (approximately 4,500 total) in Benton Harbor in less than two years.

- **Council of the District of Columbia.** Completed a third-party assessment of DC Water's Lead Free DC Lead Service Line Replacement Plan to ensure that the plan will remove and replace all lead water service lines by 2030, identifying at least $60 million in savings while replacing an additional 14,000 lead service lines.
- **Birmingham Public Schools**. Advised on the proactive implementation of Filter First requirements throughout the school district, advising on the selection and installation of filter stations throughout school buildings to achieve water quality, Americans with Disabilities Act requirements, and volume requirements in high water use areas. No detectable lead has been found in the samples collected from the newly installed filter stations. Advised on *legionella* remediation program during the COVID-19 pandemic and the proactive water flushing program implemented in response.
- **Michigan Environmental Council and Natural Resources Defense Council.** Technical advisor to the Filter First Coalition, advising on implementable requirements for addressing lead in water in Michigan schools and childcare facilities. The Filter First legislation was signed in October, 2023 making Michigan the first state to require proactive, certified lead reducing filters for all drinking water in schools and child care facilities.
- **University of Michigan.** Project supporting implementation of Michigan's Revised Lead and Copper Rule. Scope included outreach and webinars for diverse audiences, and support of the Michigan Department of Environment, Great Lakes and Energy in their implementation and oversight of the new Rule.
- **Metro Consulting Associates/City of Highland Park.** Provide technical assistance to Highland Park regarding implementation and refinement of standard operating procedures; compliance assistance with the Safe Drinking Water Act; water quality sampling and data analysis; and planning infrastructure renewal programs. The proactive community outreach program designed to support upcoming lead service line replacement programs will serve as an innovative model for building community support and participation in the program.
- **Detroit Water and Sewerage Department.** Designed and initiated a proactive lead service line replacement program for minimizing lead in drinking water that serves as a national model for protecting public health. Scope included oversight and refinement of full lead service line replacement standard operating procedures; compliance assistance with the federal and Michigan Lead and Copper Rules; water quality data analysis; development of a GIS collector application and comprehensive service line inventory; public education; and coordination with the Great Lakes Water Authority Water Quality Workgroup. This foundational work set the stage for $100 million in lead service line replacement grants awarded to the city to meet Michigan Lead and Copper Rule requirements.

Northeast-Midwest Institute (NEMWI); Washington, DC
2012-2017

Director of the Safe Drinking Water Research and Policy Program. Completed research and policy analysis while building a regional and national awareness of drinking water policy issues. Through scientific, non-partisan, and independent data analysis, provided technical assistance and education to policy-makers and the U.S. Environmental Protection Agency to support local and regional drinking water policy improvements. Principal investigator and project manager for Toward Sustainable Water Information, a collaboration between the NEMWI and USGS investigating the ability of the NEMW region's water monitoring systems to support decision making. Presented at numerous successful congressional briefings.

Washington Suburban Sanitary Commission; Water Planning; Laurel, Maryland
2008-2012

Water Planning Unit Coordinator. Led creation of a master water modeling platform for the two-county water utility, coordinating across diverse departments. Developed cross department protocols for model data management, integration, and data sharing. Assessed and communicated water system hydraulic performance for a complex water system with multiple municipal customers in a utility consisting of over 5,000 miles of distribution mains. Responsible for master planning and day to day operations, interpretation of hydraulic, GIS, metering, billing, and SCADA data to solve problems. Project Manager for consultant services as well as project team advisor for elevated tank, pipeline, and valve/vault design, and construction contracts. Forecasted water demands and sustainable growth based on water use trends, population growth, land use, and unit consumption with regional governments.

United States Environmental Protection Agency; Office of Ground Water and Drinking Water; Washington, DC
2002-2008

National Tribal Drinking Water Coordinator. Oversaw implementation of the Safe Drinking Water Act (SDWA), including National Primary Drinking Water Regulations, for EPA's national Tribal drinking water program. Identified and addressed infrastructure funding and technical challenges affecting Tribal public water systems. Developed Tribal Water Operator Certification Program. Led interagency workgroup with USDA, HHS, DOI, HUD, and tribal representatives to improve access to safe drinking water on Tribal lands.

Environmental Engineer. Technical Lead for the Stage 2 Disinfectant and Disinfection Byproducts Rule, including stakeholder review process. Led national workgroup of EPA regions and state regulators to plan implementation of the Stage 2 Disinfection Byproducts Rule. Supported simultaneous compliance concerns with the Lead and Copper Rule during the Washington, DC Lead Crisis. Team leader for Distribution System Water Quality project. Coordinated multiple contractor research projects, compiled data for regulatory decision making, and managed multi-department expert workshops.

United States Environmental Protection Agency; Office of the Chief Financial Officer; Washington, DC

2000-2002

Environmental Protection Specialist

Developed performance-based goals for Agency planning and reviewed and edited EPA Annual Reports.

United States Patent and Trademark Office; Arlington, VA

1999-2000

Patent Examiner

Analyzed patent applications to determine patentability of inventions. Researched international scientific literature in hazardous waste destruction, gas scrubbers, nuclear waste disposal, and fertilizers for patent examination.

RECENT PUBLICATIONS

- E. Betanzo and V. Speight, February 2024. Lead Service Line Replacement Costs and Strategies for Reducing Them.
- E. Betanzo, E. Pinkney, and D. Land. Benton Harbor: From Lead Crisis to Lead-Free. Journal AWWA, September 2023, p. 30-39. ***Winner of the 2023 AWWA Water Quality & Technology Division Best Paper Award***
- C. Rhyan, G. Miller, E. Betanzo, and M. Hanna-Attisha. Removing Michigan's Lead Water Service Lines: Economic Savings, Health Benefits, And Improved Health Equity. Health Affairs 2023 42:8, 1162-1172.
- E. Betanzo, C. Rhyan, and M. Hanna-Attisha. 2021. AWWA Water Science, e1261. Lessons from the first year of compliance sampling under Michigan's revised Lead and Copper Rule and national Lead and Copper Rule implications. ***Winner of the 2021 AWWA Water Quality & Technology Division Best Paper Award & 2021 AWWA Publications Award***
- Read, J., Attal, N., Betanzo, E., Harrison, R., Stoltenberg, A. (2022, January). Water Service Affordability in Michigan: A Statewide Assessment University of Michigan Water Center, Graham Sustainability Institute.
- Betanzo, E., 2021. Deconstructing the Cost of Lead Service Line Replacement.
- Betanzo, E. 2020. "How Can I Find Out if I Have a Lead Service Line?" https://www.nrdc.org/experts/erik-d-olson/how-can-i-find-out-if-i-have-lead-service-line
- Betanzo, E. 2018. "Opportunities for Addressing Lead in Drinking Water." https://safewaterengineering.com/news/addressingleadindrinkingwater

MEDIA

- GUEST COLUMN: Michigan's new lead rule for drinking water is six years old. How are we doing? Planet Detroit; July 26, 2024
- New laws require Michigan schools, daycares to filter water for lead; MLive; October 20, 2023

- Benton Harbor activists: We need more proof city's drinking water is safe; Bridge Michigan; April 18, 2022
- Petitioners worry there's a lack of transparency in new Benton Harbor water inspection report; Michigan Radio, April 18, 2022
- EPA study produces relief, concerns among Benton Harbor community; Herald Palladium; March 4, 2022
- Some lead water pipes in Michigan homes can be replaced for free; Detroit Free Press; February 12, 2022
- Efforts to Replace Michigan's Lead Water Lines Could Get Big Boost; WDET Detroit Today; December 14, 2021
- Water becomes more unaffordable for Michigan's poor, report finds; The Detroit News; December 2, 2021
- New lead testing method could reveal higher levels in water; AP News; November 30, 2021
- Why are so many Michigan water systems finding lead? They're looking harder; Bridge Michigan; October 27, 2021
- Michigan acts on lead crisis; critics urge EPA to 'jump in'; E&E News; October 15, 2021
- How the Flint water crisis has impacted US lead-pipe removal efforts; Civil Engineering Magazine, ASCE; August 4, 2021
- Lead Water Service Lines Belong in the History Books; Crain's Chicago Business; April 1, 2021
- As schools reopen, stagnant water pipes pose a health risk; Detroit Free Press; February 21, 2021
- Following Flint, increase drinking water transparency; Detroit News; December 8, 2019
- Michigan Should Revise Its Lead and Copper Rule to Protect Public Health; Bridge Magazine; June 7, 2018

COMMITTEES

- Environmental Protection Agency (EPA) National Drinking Water Advisory Council (NDWAC) 2022 through present.
- Environmental Protection Agency (EPA) Science Advisory Board (SAB) Microbial and Disinfection Byproducts (MDBP) Review Panel, 2024 through 2025.
- EPA Microbial and Disinfection Byproducts (MDBP) Rule Revisions Working Group 2022-2023.
- Southeast Michigan Council of Governments Water Infrastructure Task Force, appointed 2022-2023.
- Michigan Department of Environment, Great Lakes, and Energy (EGLE) Corrosion Control Advisory Panel, appointed 2021.
- Federal Advisory Committee on Water Information 2014 – 2017.

Prof Vanessa Speight, PhD, PE

Email: vspeight@latisassociates.com

Dr Speight is an internationally recognized expert in drinking water quality including as an advisor to USEPA for more than 25 years, most recently as a technical advisor to the MDBP rule review process. She was Managing Director of TWENTY65, the UK's Grand Challenge Centre for Water with 6 universities and 100+ collaborative partners working across the water cycle to develop innovative solutions to meet future challenges for water including product development for startups, understanding barriers to innovation, training, and culture change in water organizations. With over 30 years of experience managing large and complex projects across drinking water, wastewater and stormwater, she has worked with more than 80 water utilities and regulatory agencies across North America and Europe.

Education

2003	Ph.D., Environmental Sciences and Engineering, University of North Carolina at Chapel Hill, USA
1995	M.S., Environmental Engineering, University of North Carolina at Chapel Hill, USA
1993	B. Eng., Civil Engineering (Minor in Environmental Engineering), McGill University, Canada

Employment History

2020 – present	Professor of Integrated Water Systems, School of Mechanical, Aerospace and Civil Engineering, University of Sheffield, UK (now part-time)
2014 – 2020	Senior Research Fellow in Integrated Water Systems, Dept. of Civil and Structural Engineering, University of Sheffield, UK
2013 – 2014	Visiting Researcher, Dept. of Civil and Structural Engineering, University of Sheffield, UK
2013 – 2017	Adjunct Assistant Professor, Dept. of Civil Engineering, Queen's University, Canada
2010 – present	President, Latis Associates, Perth, ON, Canada
2003 – 2010	Associate, Malcolm Pirnie (now Arcadis), Arlington VA, USA
1995 – 1998	Engineer, Montgomery Watson (now Stantec), Tampa FL, USA

Professional Registration

Fellow, Royal Society of Public Health (UK)
Professional Engineer (USA): Maryland

Recent Advisory Boards and Professional Service

Deputy Editor, *AWWA Water Science Journal*, 2022 - present

Judge, Ofwat Innovation Fund Breakthrough Challenge (£40M+ awarded to innovative water solutions) 2024-2025

Judge, Aqualunar Challenge, UK Space Agency and Canadian Space Agency, awarding £1.2M to technologies that could purify water buried beneath the moon's surface, 2024-2025

Judge, Ofwat Innovation Fund Water Discovery Challenge (£4M to water technologies), 2024

Advisor to US Environmental Protection Agency on drinking water regulation and research program development, including the National Drinking Water Advisory Council: Microbial and Disinfection Byproducts (MDBP) Rule Revisions Working Group, Lead & Copper Rule Revisions, Long-Term 2 Surface Water Treatment Rule, Revised Total Coliform Rule (RTCR), and Stage 2 Disinfectants and Disinfection By-Products Rule, RTCR

Research and Information Collection Partnership, and Aging Infrastructure Research Program, 2000 – present
Strategic Board Member, African Research Universities Alliance (ARUA) Centre of Excellence in Water, providing oversight and strategic direction to grow the centre, 2019 – present
Editorial Board Member, Journal of Public Health in Practice, 2020 – 2023
Grant Reviewer, multiple research funding agencies including USEPA, NSERC, UKRI, EU, 2009 – present
Member, UK Institute of Civil Engineers Publications Award Panel, 2020 – present
Scientific Adviser, UK Defra/Joint Biosecurity Centre Wastewater Programme, 2020 – 2021
Panel Member, Civil, Industrial and Systems Engineering Grant Evaluation Group, Natural Sciences and Engineering Research Council (NSERC) of Canada, 2017 – 2020
Work Group Co-Chair, Water Research Foundation International Summit on Environmental Surveillance of COVID-19 Indicators in Sewersheds, 2020
Associate Editor, AWWA Water Science Journal, 2018 – 2022
Trustee, American Water Works Association (AWWA) Water Science and Research Division Board, 2010 – 2013
Local Host and Organising Committee Member, What is the Future for Public Health and Water?, RSPH, Sheffield, UK, 2018 & 2019; online 2023
Scientific Committee Member, Computing and Control for the Water Industry (CCWI) Conference, Sheffield 2009, Exeter 2011, Exeter 2019, Valencia 2022, Leicester 2023, Ferrara 2024, Sheffield 2025, Paphos 2026

Recent Projects

To Chlorinate or Not to Chlorinate (Co-Investigator): 3.5-year research project investigating the impact of disinfection practices on biofilms, with a focus on the potential for pathogen survival after contamination events through laboratory, pilot-scale, and modelling research. In collaboration with the University of Glasgow. *EPSRC and UKWIR, £2.2M*

Wat-Qual (Principal Investigator): Marie Curie RISE project Water Quality in Drinking Water Distribution Systems, examining how traditional operational and maintenance practices within water utilities in different countries influence drinking water quality through a series of industry-university secondments. 48 months of secondments took place among 17 partners in 11 countries. In collaboration with KWR and PWN, Netherlands. *EU Horizon 2020, €243k*

Material Destiny (Principal Investigator): Collaborative project with 4 UK water companies to investigate storage tanks and their role in distribution system water quality. *EPSRC, Anglian Water, Northumbrian Water, Scottish Water, Welsh Water, £375k*

Source to Tap Cost-Benefit Analysis of Manganese Control (Principal Investigator): Evaluation of trends and relationships across all Scottish Water Systems using machine learning to understand opportunities for manganese control and management. *Scottish Water, £85k*

Influence of Changing Disinfection Practices on Biofilms in Drinking Water Distribution Systems (Co-Investigator): Project using bespoke pipe loops installed at the ends of free chlorine and chloraminated distribution systems to understand biofilm differences and the effectiveness of interventions such as flushing and switching to free chlorine. *EPSRC and Scottish Water, £150k*

Real-time Bacteriological Monitoring in Distribution Systems (Principal Investigator): Report on the state-of-the-art in bacteriological monitoring with recommendations on how to integrate such monitoring into an overall distribution system sampling plan. *EPSRC and UKWIR, £110k*

Understanding Drinking Water Quality through Enhanced Analytics (Principal Investigator): Project to determine a framework for the application of machine learning techniques to derive actionable information from historical water quality data. *EPSRC and Scottish Water, £130k*

Investigating Potable Water Distribution Networks and Consumer Demand for Systems Subjected to Low Pressures and Intermittent Supply (UK Lead): Laboratory and pilot-scale experimental study of biofilm dynamics in intermittently supplied water systems. With University of Massachusetts Amherst. *EPSRC and NSF, $420k*

TWENTY65 (Managing Director): 5-year initiative dedicated to solving the grand challenge of clean water for all. Including 5 other UK Universities and over 100 partners, the initiative aims to conduct collaborative, transformative socio-technical research in 8 theme areas to develop a vision for water systems of the future. As Managing Director, developed governance structure and managed day-to-day activities, including the creation and operation of a Water Innovation Hub to accelerate uptake of innovation. *EPSRC, £4M*

Drinking Water Quality Big Question (Principal Investigator): This project developed a prioritized list of research needs to address the big question: how can we achieve 100% compliance with drinking water standards at point of use by 2050? *UKWIR, £30k*

Selected Publications

Perera IR, Speight V, Young S, Boxall J. 2026. Uncovering Gaps and Opportunities in Water Distribution System Operations through Graph-Database-Driven Data Utilization and Process Mapping, *AQUA – Water Infrastructure, Ecosystems and Society* [accepted 26 May, 2026].

Suslovaite V, Speight V, Shucksmith J. 2025. A catchment land management optimization approach to mitigate impacts of rainfall driven pesticide loadings on water supply systems, *Journal of Hydrology* 663, Part A, December 2025, 134123.

Speight V, Boxall J. 2025. Pathways to Different Urban Water Futures: 'Silver baskets' of Sociotechnical Solutions, *Environmental Research: Infrastructure and Sustainability (ERIS)*, 5:3:005036.

Crowley G, Tait S, Panoutsos G, Speight V, Esnaola I. 2025. Information-theoretic sensor placement for large-scale sewer networks, Water Research 268 Part B: 122718.

Kyritsakas G, Boxall J, Speight V. 2024. A data-driven predictive model for disinfectant residual in drinking water storage tanks, *AWWA Water Science* 6:3:e1376.

Kennedy (Doronina) A, Husband S, Boxall J, Speight V. 2024. A metric for drinking water service reservoir performance as a sink or source of material, *AQUA - Water Infrastructure, Ecosystems and Society* 2024; jws2024039.

Bond V, Nel M, Simuyaba M, Muchelenje J, Chirwa T, Simwinga M, Speight V, Mhlanga Z, Jacobs HE, Nel N, Seeley J, Mwanaumo E, Viljoen L, and Hoddinott G. 2023. Broad Brush Surveys: a rapid qualitative assessment approach for water and sanitation infrastructure in urban sub-Saharan cities, *Frontiers in Sustainable Cities*, Volume 5.

Boxall JB, Blokker M, Husband S, Schaap P, Speight V. 2023. Managing discolouration risk in drinking water distribution systems by understanding material behaviour, *Water Research* 243, 1 September 2023, 120416.

Palmer C, Tanner J, Akanmu J, Alamirew T, Bamutaze Y, Banadda N, Cleaver F, Faye S, Kabenge I, Kane A, Longe E, Nobert J, Speight V, Nsengimana V, Weston S, Winter K, Woldu Z. 2023. The Adaptive Systemic Approach: Catalysing more just and sustainable outcomes from sustainability and natural resources development research, *River Research and Applications* 1– 15.

Kyritsakas G, Boxall J, Speight V. 2023. A big data framework for actionable information to manage drinking water quality. *AQUA – Water Infrastructure, Ecosystems and Society*, 72:5:701-720.

Kyritsakas G, Boxall J, Speight V. 2023. Forecasting bacteriological presence in treated drinking water using machine learning, *Frontiers in Water,* Sec. Water and Artificial Intelligence, Volume 5 – 2023.

Doronina AV, Husband PS, Boxall J, Speight VL. 2023. Influence of service reservoir construction age on the likelihood of bacteriological failure occurrence, *Institute of Water Journal* 8:4-8.
Doronina AV, Husband SP, Boxall JB, Speight VL. 2020. The Operational Value of Inlet Monitoring at Service Reservoirs, *Urban Water* 17:8:735-744.
Speight V, Rubinato M, Rosario Ortiz, FL. 2019. Are secondary disinfectants performing as intended? *Journal AWWA* 111:11:38-43.
Linden K, Hull N, Speight V. 2019. Thinking outside the treatment plant: UV for water distribution system disinfection, *Accounts of Chemical Research* 52 (5) 1226-1233.
Speight V, Mounce S, Boxall J. 2019. Identification of the Causes of Drinking Water Discoloration from Machine Learning Analysis of Historical Datasets, Environmental Science: Water Research & Technology 5:747-755.
Ellis K, Gowdy C, Jakomis N, Ryan B, Thom C, Biggs CA, Speight V. 2018. Understanding the costs of investigating coliform and E. coli detections during routine drinking water quality monitoring, Urban Water 15:2:101-108.
Rosario-Ortiz F, Rose J, Speight V, von Gunten U, and Schnoor J. 2016. How do you like your tap water?, *Science* 351 (6276) 912.
Speight V. 2015. Innovation in the water industry: barriers and opportunities for US and UK utilities, *WIREs Water*, 2:301-313.
Spiesman AL and Speight VL. 2014. A risk-based methodology for contaminant prioritization, Journal AWWA 106(3)E150-E159.
LeChevallier MW, Besner MC, Friedman M, and Speight VL. 2010. Microbiological quality control in distribution systems, in *Water Quality and Treatment, 6th Edition*, J. Edzwald, ed., AWWA, Denver, CO.
Speight V, Khanal N, Savic D, Kapelan Z, Jonkergouw P, and Agbodo M. 2010. *Guidelines for Developing, Calibrating and Using Hydraulic Models*, Water Research Foundation, Denver, CO.
Speight V, Uber J, Grayman WM, Martel K, Friedman M, Singer PC, and DiGiano FA. 2009. *Probabilistic Modeling Framework for Assessing Water Quality Sampling Programs*, Water Research Foundation, Denver, CO.
Speight VL and Singer PC. 2005. Association between residual chlorine loss and HAA reduction, *Journal AWWA* 97:2:82-91.
DiGiano FA, Speight VL, and Zhang W. 2004. *Disinfectant Decay and Corrosion: Laboratory and Field Studies*, Water Research Foundation, Denver CO.
Speight VL, Kalsbeek WD, and DiGiano FA. 2004. Randomized stratified sampling methodology for water quality in distribution systems, *Journal of Water Resources Planning and Management* 130:4:330-338.