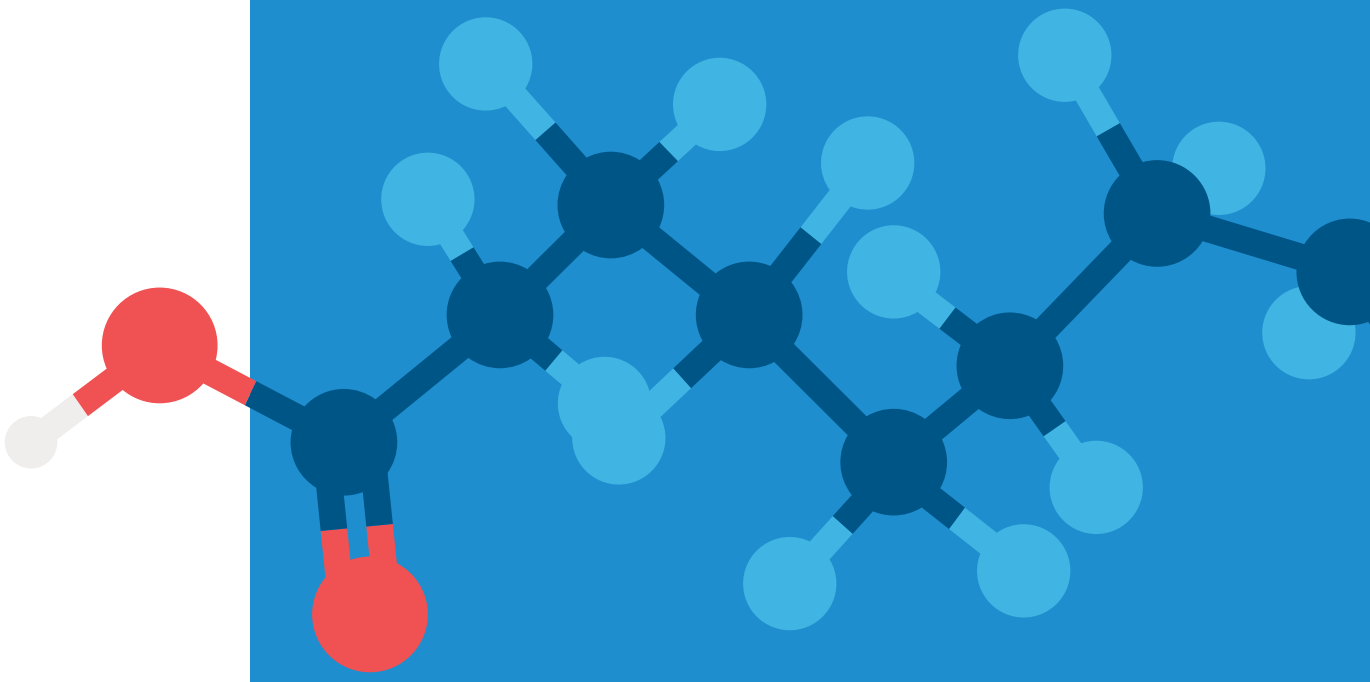

A CLEAN WATER UTILITY'S GUIDE TO CONSIDERING SOURCE IDENTIFICATION, PRETREATMENT, AND SAMPLING PROTOCOLS FOR PFAS

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Background

These considerations were compiled by NACWA member utilities that have experience with PFAS because they are located in states where legislative and/or regulatory agencies have required utilities to begin sampling effluent, biosolids or other environmental media for PFAS and/or where states have increased their attention to these contaminants by forming task forces or other groups to look further into PFAS contamination and develop response actions.

NACWA created a **PFAS resources page** on its website to provide additional background information on PFAS with resources that can be helpful to utilities dealing with PFAS issues. We recommend that you review those materials first if you are not already familiar with the basics of the chemicals that make up what we collectively call PFAS.

Nothing in this document is intended as legal or regulatory advice or recommendations to utilities regarding PFAS, nor should anything in this document be intended as such. This document also does not create any legal or regulatory obligations for utilities, nor does it suggest any "best practices" for utilities to follow. Instead, this document is intended to provide a series of considerations for utilities that have questions regarding PFAS or are evaluating potential actions related to PFAS.

Why is There a Need for Utilities to Consider PFAS Source Identification and Sampling Protocols?

As EPA continues to evaluate how best to address PFAS at the national level, states are moving forward and creating a patchwork of PFAS requirements that could impact the clean water community.

As examples, in Michigan, state regulatory authorities have established effluent **monitoring and industrial pretreatment requirements** for utilities. In Maine, the state—through an unanticipated memorandum—applied extremely low concentration screening values for biosolids. That decision effectively prohibits the distribution of compost and land application of biosolids in **Maine** if these levels are exceeded. California, through a phased approach, is **taking steps to evaluate** sources and concentrations of PFAS in surface waters and groundwater. And Wisconsin is in the early stages of identifying PFAS sources and asking utilities to voluntarily sample influent and effluent and report if certain exceedances are found.

As states continue to tackle PFAS in this erratic, non-uniform fashion, clean water utilities—who are not sources of PFAS but mere passive receivers—are being challenged to identify the sources of PFAS coming into their systems. Utilities are working to be able to respond accordingly to state authorities and the public, as well as to have a clear path forward to better understand how to sample and ultimately manage these emerging contaminants through their industrial pretreatment programs. Although a utility's pretreatment program is one avenue to possibly mitigate PFAS in water resources, source control and eliminating these chemicals from manufacturing and our everyday commercial products is the best way to prevent further PFAS contamination in the environment.

Utilities are also being challenged with how to communicate with the public and their local communities about PFAS issues, especially in terms of risk and what is appropriate for utilities to be doing now in terms of monitoring and testing. This is becoming especially acute around biosolids, as both national and local press are increasingly focused on the perceived risk to the public from PFAS in biosolids. Additional resources on the communication issue are available on NACWA's **PFAS resources page** and the Association will continue to provide assistance in this area.

How to Use this Guide

This document outlines source identification and pretreatment considerations for utilities as well as some thoughts on sampling plans and protocols. As noted above, these considerations are not intended to be construed as legal advice and is for general informational purposes.

I. Source Identification and Pretreatment

As a first step in evaluating PFAS issues for your utility, consider the makeup of industrial users regulated by your pretreatment program. Examine your active permitted significant industrial user (SIU) list for sources. To date, utilities have identified a number of industries that are most likely to be sources of PFAS (see list below):

- Military bases
- Airports
- Metal plating, etching, and electroplating
- Paper and packaging manufacturers
- Laundry services
- Landfills and leachate
- Centralized waste treatment
- Stain and water-resistant textiles
- Industrial surfactants, resins, molds, plastics
- Tanneries and leather, fabric, carpet treaters

It may also be a good idea to include industries that have the potential to be or are probable sources of PFAS (see list below). Identifying sources that may be potential or probable PFAS contributors can be a little more difficult, especially if the sources are contributing trace levels. It is important to note that source identification is evolving as we learn more about the broad use and application of PFAS in manufacturing.

Potential sources of PFAS include but are not limited to the following industrial categories:

- Automotive services
- Wire manufacturing

- Oil and petroleum refineries
- Firefighting training academies
- Photolithography, semiconductor industry
- Hospitals
- Trucked waste or septage
- Paints, cleaners, and sealants
- Mobile washwater services
- Tank/tanker/bulk container cleaning
- Groundwater
- Domestic septage

Domestic-Only Systems

Not all utilities have industrial inputs and because of the ubiquity of PFAS in our environment, it is probable, if not likely that POTWs have some concentrations of PFAS coming into and passing through the systems from *domestic sources*. Domestic source contributions are related to the everyday commercial products used in households (e.g., nonstick cookware, cleaning products, personal care products, waterproof clothing, as well as stain repellant rugs and furniture).

Few studies have been conducted on domestic PFAS inputs to wastewater treatment facilities and depending on the action levels being considered by your state, domestic source inputs may not be an issue for your utility. Some states are considering or have passed legislation going further than EPA's 70 ppt drinking water advisory level for PFOA/PFOS combined. If your utility is in one of these states or your utility has a large domestic service area, further considerations may be necessary as domestic-only sources of PFAS may exceed more stringent thresholds.

In addition, if voluntary sampling at your utility reveals consistent detections despite not having any major industrial sources, review the sampling and analytical protocols to confirm that these are not field or laboratory-derived contamination (see Sampling Plans and Protocols below). If your sampling protocols check out and PFAS is primarily from domestic inputs, these data may reflect contributions from products and packaging in common use that have a pathway to the sewer system.

As information on domestic inputs becomes more readily available, a communication and outreach plan to work with the public on understanding their source contributions is critical. Further, as states establish lower PFAS response or action levels for utilities, it may be useful to explore chemical bans, bans on the use of certain products, and/or substitutions for existing products, but this will undoubtedly require state or federal legislative or regulatory action.

Potential Pretreatment Actions

Where a permitted industrial user is a likely source of PFAS (see list above), utilities are generally requiring sampling. If an industrial user is or formerly used hexavalent chromium, utilities are also requiring sampling because these users often use PFAS precursors as a mist suppressant. For industries that are potentially or probably contributing to PFAS inputs to the POTW (see list above), PFAS sampling has been case-specific and warrants further investigation.

If your utility has an industrial pretreatment program, it may be a good idea to develop a PFAS strategy and share the concerns with your industrial users. As a first step, before sampling is required, it would be beneficial to have industrial users review their existing processes and raw products to determine whether or not there is a likelihood of PFAS present. Maintaining a collaborative relationship between your utility and your industrial users will help to identify ways to minimize, reduce, and eliminate PFAS from the industrial stream with product substitution and/or additional operational controls.

Other Additional Pretreatment Actions to Keep in Mind

Currently, ***there is no EPA-approved analytical testing method for PFAS or the suite of PFAS precursors in environmental media other than drinking water***. This is a critical fact that utilities must consider when evaluating action on PFAS and when communicating with the media/public. Further, there are more than 3,000 known PFAS constituents, which adds to sampling limitations and prioritization issues on which chemicals to search for in the pretreatment process. Testing methods will be discussed in more detail in the Sampling Plan and Protocols section below.

II. Sampling Plan and Protocols

A few utilities have started sampling for PFAS constituents in wastewater influent, effluent and biosolids and some state associations are counseling their members to do basic sampling of at least the influent to their wastewater treatment plants to assess PFAS levels. As your utility considers and evaluates whether or not to conduct your own sampling, it is important to first go through the source identification process (see Section I) to see if there is a clear, significant industrial user(s) or if there are probable or possible users. This effort may help in your decision to undergo sampling.

Is the State Seeking Voluntary Sampling from POTWs?

One question that continues to be an issue for utilities that are considering voluntary sampling for PFAS in their effluent and/or biosolids centers around risk. Are there potential risks to collecting this data voluntarily? Are there positives to sampling before a state regulatory authority requests sampling or monitoring data?

If a utility voluntarily decides to sample for PFAS in influent, effluent and/or biosolids, consider setting clear parameters on how you will use the data once obtained. Is the data intended for internal decision-making purposes

only? At first, a utility, in the absence of water quality standards or biosolids limits, may want to consider a qualitative—present or absent—approach. If PFAS are present after voluntarily sampling, the utility ideally has already conducted pretreatment source identification and can communicate further with industrial sources to reduce or eliminate these inputs.

Is the State Requiring Sampling from POTWs?

A utility should consider the following when engaging with the state regulatory authority on any sampling:

- Is there a base understanding or agreement on a sampling plan? (e.g., sample quantities, analytical methods replication, frequency, and whether to include trip blanks)
- What PFAS compounds or precursors should be sampled for?
- Where in the treatment process or collection system is the state seeking sampling?
- Are there reporting requirements either to the state or to the public?
- Is sampling outside the POTW required for context? (e.g., receiving stream, groundwater)

Some states, like Michigan, have sponsored sampling of wastewater and water supplies for PFAS. Additionally, the state requires POTWs that identify one or more sources to begin implementing a quarterly effluent sampling program. As states establish requirements for permitted dischargers to sample, it is important to have a clear understanding on a sampling plan.

Sampling Procedures & Methods

One challenge to sampling and analyzing for PFAS is the fact that EPA only has approved a **testing method** for PFAS in drinking water (EPA Method 537 Revised 1.1 and EPA 537.1). ***There is no EPA-approved testing method for PFAS or their precursors in other environmental media (wastewater, surface water, groundwater, recycled water, or biosolids)***. The Department of Defense (DoD) has not published a testing method, but it has published accreditation standards for PFAS analytical methods (See DoD Quality Systems Manual in *Resources*). The DoD accreditation standards are often misidentified as "Modified Method 537." The DoD's accreditation standards include a table of QA/QC requirements that labs must comply with when testing for PFAS in matrices other than drinking water in order to generate data acceptable to the DoD, but they are not a testing method.

Absent an approved EPA method for sampling PFAS in wastewater, some utilities are applying **ATSM Method D7979**, which can assess approximately 30 target analytes. This method requires less sample handling and therefore reduces bias. Depending on your utility's location, ASTM Method D7979 may be an alternative method to sample for PFAS in wastewater and ASTM D7968-17 for PFAS in soil.

An emerging technique for sampling PFAS is the Total Oxidizable Precursor (TOP) Assay which can be used for both wastewater and biosolids. The TOP Assay provides an estimate of the total concentration of difficult to measure PFAS and PFAS precursors, but it is limited in that this method cannot identify individual precursor compounds. In addition, this methodology is more cost intensive because analysis must be done before and after oxidation. EPA is currently evaluating this methodology. It is available in some commercial labs.

Expectations When Testing for PFAS

When sampling for PFAS it is absolutely critical to have a data quality control objective before you begin and to make sure that your efforts are fit-for-purpose. For example, is your utility conducting a range finding study or screening survey? Or, is your utility looking to narrow in on a daily load estimate? These fit-for-purpose questions illustrating what your utility is trying to demonstrate or achieve in the end, will help with your sampling design (e.g., sample quantities, replication, and frequency).

Finding an approved laboratory may be difficult. There are a few DoD accredited laboratories that can analyze PFAS (currently 13 laboratories) and can do so accurately to the part per trillion level, but labs can also be backlogged with analyzing samples from other sources. In addition, even where both laboratories are applying the DoD Quality Systems Manual (accreditation standards) when analyzing PFAS, there may be variability in the results.

Other Sampling or Testing Considerations

Sampling for PFAS will be cost intensive for any utility to undertake. Estimates of costs to sample for PFAS can be anywhere from $300 per soil sample and up to $2,000 per effluent sample. Utilities should not skimp on quality assurance and quality control when sampling. Make sure that your utility's sampling plan incorporates sufficient replicates blanks, matrix spikes and matrix spike duplicates (MS/MSD) to help with quality assurance and control.

It is important that the sampling work is performed by qualified or certified professionals experienced in monitoring of emerging contaminants to the ppt level. With PFAS, this could not be more important. Contamination from personnel and laboratory equipment can contribute to increased PFAS levels in your data. **Maine** and **Michigan** have standardized sampling protocols that minimize the likelihood of cross-contamination that could be incorporated into your sampling plan (See Maine Sampling and Screening Procedure and Michigan's Sampling Guidance in Resources).

Although PFAS sampling will be costly, the risks are equally high. It is important to note that initial sampling, done properly, is far cheaper compared to the cost of bad data, false positives or negatives, data that are unusable, or the cost for clean-up, mitigation, or even litigation.

Next Steps & Public Communication

The above content reflects some initial considerations utilities should think about with respect to PFAS source identification and pretreatment as well as some sampling and testing protocols. Our understanding of PFAS is in its infancy. We are continually learning more about the complex chemistry of the plethora of PFAS chemicals and their precursors as well as the everyday commercial products that are comprised of PFAS.

Risk communication and public outreach are obvious next steps. There is a tremendous amount of misinformation out there about PFAS, including on the potential risk to human health. It is critical that utilities communicate with the public on PFAS issues in a way that acknowledges the growing public concern, but that does not appear indifferent to it. Utility communication should also seek to educate the public and ratepayers on both the known and unknown risks of PFAS and the role public clean water utilities are taking to ensure that there is a rigorous, scientifically based approach to PFAS that is grounded in actual data, risk levels and effective source control, not just a reactionary approach based on fear. NACWA, in conjunction with the Water Environment Federation, has developed some **talking points** to help with this communication, and also hosted a **webinar** on this topic.

As more information and data come to light, clean water utilities should consider partnerships with other local agencies (e.g., health departments and drinking water utilities) along with the state regulatory authorities, to help best communicate with and inform the public. Establishing these partnerships early, even before sampling for PFAS, can improve communication efforts, including on what any sampling results mean.

Acknowledgments

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Resources

DEP'T OF DEFENSE AND DEP'T OF ENERGY, CONSOLIDATED QUALITY SYSTEMS MANUAL FOR ENVIRONMENTAL LABORATORIES (V. 5.1) (2017), available at https://www.denix.osd.mil/edqw/documents/documents/qsm-version-5-1-final/ (last visited Nov. 21, 2019).

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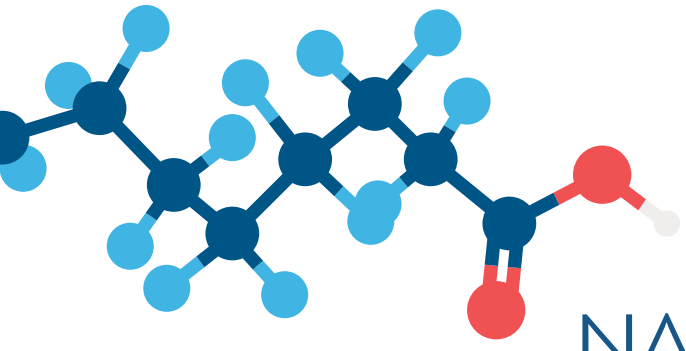

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