Bridges

Issue 19: Winter 2018

Connecting the Nation's Environmental Laboratories

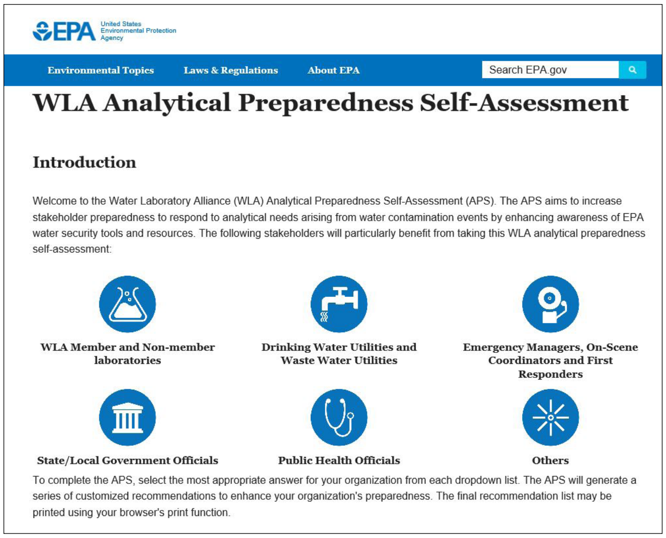
Is Your Lab Ready? EPA's New Analytical Preparedness Self-Assessment Tool Can Help You Get There

By Terrance Glover, ORISE research participant, EPA, Office of Ground Water and Drinking Water, Water Laboratory Alliance

Laboratories supporting the water sector should be prepared to provide analytical services in the wake of unforeseen water contamination incidents. The expectation of swift and accurate analyses, amid potentially unstable environmental conditions and a host of other possible disruptions in service, can contribute to tense working conditions. Laboratories that take preparatory measures prior to incidents are better equipped to overcome such challenges, despite the heightened sense of urgency associated with contamination response.

To assist the laboratory sector's response to and preparedness for analytical surges, the US Environmental Protection Agency's (EPA) Water Laboratory Alliance (WLA) Program has published several resources. To increase an awareness of those resources and illustrate their benefits, the Analytical Preparedness Self-Assessment (APS) tool was created. Expected to be released in spring 2018, the APS is a collection of resources to assist laboratories, water utilities and other water professionals as they formulate an understanding of their organization's ability to address drinking water and wastewater contamination incidents.

Using the WLA tools as an evaluation baseline, the APS asks questions that gauge how familiar a stakeholder may be with particular response tools and how well they have been incorporated into their standard operating procedures. For example, one question asks whether a stakeholder's laboratory has completed a Continuity of Operations Plan (COOP), a fillable template detailing steps that will be taken during an emergency to ensure that critical laboratory



The future homepage for the EPA Water Laboratory Alliance Analytical Preparedness Self-Assessment Tool.

Inside this issue

The Association of Public Health Laboratories (APHL) works to strengthen laboratory systems serving the public's health in the US and globally. APHL's member laboratories protect the public's health by monitoring and detecting infectious and foodborne diseases, environmental contaminants, terrorist agents, genetic disorders in newborns and other diverse health threats.

Funders

This publication was supported by Cooperative Agreement #NU60OE000103 funded by the Centers for Disease Control and Prevention (CDC). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of CDC or the Department of Health and Human Services.

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processes continue. Then further questions ask if that COOP has been refined through exercises, if staff training on the COOP has been documented and if staff-specific information has been included in the COOP. The questions throughout the APS generally follow this pattern of increasingly detailed planning.

The APS uses a multiple-choice format and, with fewer than 30 questions, the assessment should only take 10 to 20 minutes to complete. At the end of the assessment, users will be provided a list of customized recommendations with key resources and actions the user may enact based on their responses to the questions. There are no scores associated with the APS, as this resource is meant to be an educational vehicle for self-evaluation. The intent is to encourage users to reflect on their organization's capabilities and learn about steps they can take to feel a greater sense of preparedness for water contamination events. When implemented before contamination incidents occur, these actions help ensure that after-incident tasks are carried out effectively.

To learn more, please visit the Water Laboratory Alliance website.

Regular Testing Needed for Unregulated Drinking Water Systems

By Doug Farquhar, environmental health director, National Conference of State Legislators

Although 89.5% of US drinking water is delivered by a public water system governed by the federal Safe Drinking Water Act, the remaining 10.5%—more than 34 million people—get their drinking water from an unregulated system,[1] either a private well or a service that serves less than 15 residences.

The Importance of Well Testing

Overall, illnesses from public drinking water systems are on the decline, but in unregulated systems they are increasing[2] (Figure 1). Once a private water well has been constructed and installed, it is the responsibility of the well owner to test the water and ensure it remains free of pollutants. See "Recommended Testing for Private Water Wells," right, for more information on testing schedules.

Private wells can become contaminated when polluted water—from landfills, failed septic tanks, underground fuel tanks, fertilizers and pesticides, mining activities, runoff from urban areas and more—seeps into the ground water and then the well.[3] If contaminated well water is consumed, it could lead to illness. The most common ailment is gastrointestinal illness, but hepatitis and other threats are also common (Figure 2).

Recent studies show 23% of private wells contain contaminants in excess of EPA drinking water standards. A study in Iowa showed 8% of private

1 The National Groundwater Association (2016). USA Groundwater Use Fact Sheet.
2 Craun, G.F., et al. Causes of outbreaks associated with drinking water in the United States from 1971 to 2008. Clin. Microbiol Rev. 2010; 23(3):507-28.
3 American Society for Microbiology, 2016.

Recommended Testing for Private Water Wells

Annually

- Bacteria
- Nitrates

Every Three to Five Years

Standard analysis test for:

- Arsenic
- Chloride
- Copper
- Fluoride
- Hardness
- Iron
- Lead
- Manganese
- pH
- Sodium
- Uranium

Radiological analysis test for:

- Radon
- Uranium

Volatile Organic Compounds test for:

- Solvents
- Gasoline
- Greases
- Cleaners
- Pesticides

(New Hampshire Department of Environmental Services, 2016)

Remember: testing should always be performed by a certified lab!

wells had arsenic levels above EPA standards, while in New Hampshire it was as high as 20%.[4] Most of these contaminants came from natural sources, such as radon and arsenic, but nitrates from fertilizers and septic systems were also found in a quarter of all wells in agricultural areas.

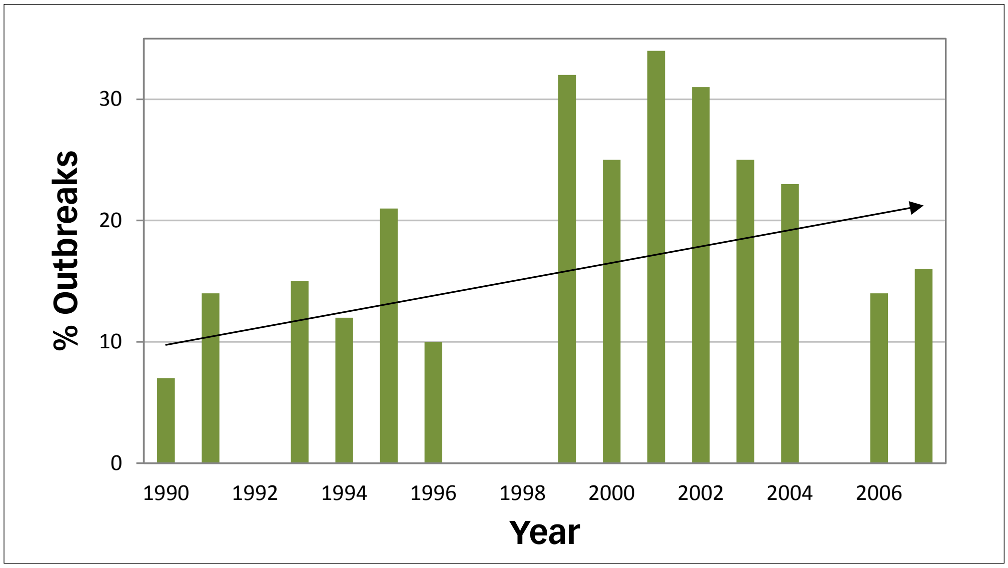

Figure 1: Percentage of Outbreaks in Non-Regulated Drinking Water Systems. (US Centers for Disease Control and Prevention, 2014)

Well Water Regulations

Federal Action

The US Environmental Protection Agency (EPA) does not regulate private drinking water wells, but does provide information for homeowners in the care and maintenance of private wells to protect their health.

The US Centers for Disease Control and Prevention (CDC) Private Well Initiative looks at the health impacts of drinking from private wells. The initiative collects private well data from states to determine their general water quantity and quality. The CDC uses these data to identify and promote interventions to improve private well water quality.

State Action

Like the federal government, no state requires maintenance and annual testing of private wells, but all recommend it. Connecticut requires testing of newly constructed wells; New Jersey requires landlords to test their wells every 5 years. New legislation in North Dakota requires mineral developers to test private wells within half a mile of their development. New Mexico requires well identification tags on private wells.

The state of Washington regulates private systems serving two or more households, requiring owners to follow water quality and operation requirements. Wells must be tested for bacteria annually.

Several states require property owners to disclosure whether the property uses an unregulated source of water before selling. Arizona, Connecticut, and Illinois require sellers to disclosure 'any issues' with the private water supply. Testing results of the water source must be

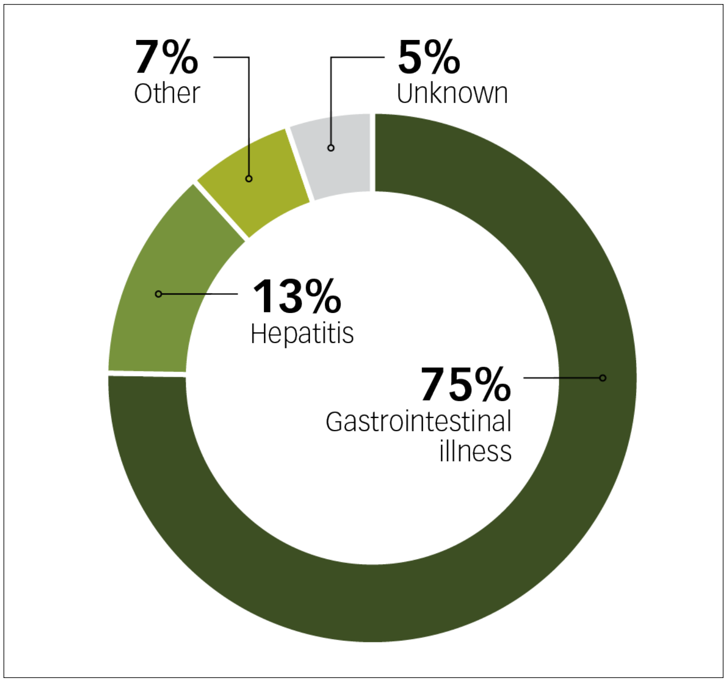

Figure 2: Illnesses From Unregulated Water. (American Society for Microbiology, 2016)

[4] New Hampshire Department of Environmental Services (2016). Protect Your Family's Health: Test your water today for all common pollutants.

disclosed in Alaska, Colorado, Connecticut, Iowa, Kentucky, Louisiana, Maine, Maryland, Michigan, Mississippi, Nebraska, New Hampshire, New Jersey, New York, North Carolina, Oregon and Pennsylvania.

Many state programs provide assistance for private well-owners to test their wells. Delaware offers a low-cost test kit, while Iowa offers homeowners a subsidized testing program and Illinois tests private wells upon request of the homeowner. Maine provides testing, but charges the homeowner for the service.

Six bills were enacted in 2017 regarding the testing and treatment of private well water. Connecticut H 7222 (Act No. 17-146) allows local departments of health to require wells be tested for contaminants that may be found in the groundwater. Maine H 321 (Act No. 230) also addresses the testing and treatment of contaminants in private drinking water wells. North Carolina S 131 (Act No. 2017-10) clarifies private drinking water well permitting requirements; North Dakota H 1409 (Act No. 254) provides that if a person refuses to consent to the testing of a water well or water supply by a mineral developer, the person forfeits any claim for relief against that developer. Arizona H 2094 (Act No. 213) and Maine S 426 (Act No. 28) provide financing for the treatment of private drinking water wells.

Contact

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Resources for Well Owners

- CDC's Private Well Initiative
- EPA's Private Drinking Water Wells webpage
- National Groundwater Association's WellOwner.org
- New Hampshire Dept. of Environmental Services' Private Well Testing Program

New Radiochemistry Tools and Training Support the Implementation of the Revised 2016 TNI Standard

By Bob Shannon, owner, Quality Radioanalytical Support, and chair, TNI Radiochemistry Expert Committee

History of the TNI Standard

Consensus standards assuring the quality of measurement data used for environmental decision making are always being improved.

Since the 2003 National Environmental Laboratory Accreditation Conference (NELAC) Standard was approved almost 15 years ago, the NELAC Institute (TNI) has revised the document twice, in 2009 and 2016. The *TNI Environmental Laboratory Sector Standard* (formally the *NELAC Standard*) expands on an international standard that is used by laboratories to develop their management system for quality, administrative and technical operations, ISO/IEC 17025 (*General Requirements for the Competence of Testing and Calibration Laboratories*). While the TNI Standard's management/quality system requirements generally parallel those of the ISO/IEC standard, it also specifically addresses environmental testing and establishes requirements for technical areas, such as radiochemistry.

Prior to the TNI Standard, the US Environmental Protection Agency (EPA) Drinking Water Laboratory Certification Program was the only national environmental laboratory certification/accreditation program for radiochemistry. The TNI Standard fills a gap by defining a management/quality system that extends beyond Safe Drinking Water Act compliance testing to address a broad range of environmental matrices and measurement techniques routinely performed by environmental radiochemistry testing laboratories.

Radiochemistry in the TNI Standard

For the first ten or so years of its existence, the TNI Standard was maintained by a committee of quality systems experts. While the committee had extensive experience in quality assurance, their radiochemistry background was relatively limited. In 2012, TNI established a Radiochemistry Expert Committee that was charged with maintaining Volume 1, Module 6 of the TNI Standard. The Committee worked over the next two years to revise this radiochemistry module; the updated module was approved by TNI in 2015 and will be implemented as part of the 2016 TNI Standard. The revision more clearly, consistently and completely addresses radiochemistry measurements and provides flexibility to support a variety of environmental programs and matrices. A webinar, "The New TNI Radiochemistry Standard," is available at the TNI website that describes changes between the 2009 and 2016 TNI Standards.

Albuquerque trainees discuss radium-228 data in small groups. (Photo credit: Ilona Taunton, The NELAC Institute)

The TNI Radiochemistry Expert Committee is also developing tools and training to support National Environmental Laboratory Accreditation Program (NELAP) accreditation bodies and laboratories as they implement the 2016 TNI Standard. Most of these tools will benefit non-NELAP entities, as well. A checklist tailored to the new standard will be available for assessors to use in preparing

and performing laboratory assessments and will also help laboratories ensure that they adequately implement the TNI Standard. The committee also recently completed a radiochemistry chapter in the *TNI Small Laboratory Handbook*. Although the handbook targets small laboratories, its will be equally informative for large radiochemistry laboratories, assessors and anyone interested in understanding radiochemical measurement quality.

A series of five 6-8-hour technical radiochemistry training courses will be offered to assessors and laboratories. The first of these, “Understanding Radiochemistry Testing and the TNI 2016 Standard – EPA Method 904.0,” was just completed at TNI’s Semi-Annual Meeting: Forum on Environmental Accreditation in Albuquerque, New Mexico and will be available in March 2018 as a recorded webcast on TNI’s website. The class describes the radiochemical separations and gas-flow proportional counting measurement techniques used to determine radium-228 in drinking water. EPA’s Method 904.0 was selected for the initial training round because it touches most every aspect of radiochemical measurements using gas flow proportional counting. The series will continue this summer at the 2018 National Environmental Monitoring Conference (August 6-10, New Orleans) with full-day training on liquid scintillation spectrometric determinations of tritium in water and gross alpha and beta (ASTM 7283/SM 7110D). Technical training classes at three subsequent TNI meetings will address gamma spectrometry and alpha spectrometry methods as well as laboratory-developed methods. Continuing education credits will be available for successful completion of the training classes.

Learn More

The tools and training webinars can be accessed within the training tab of the TNI website. Please contact Ilona Taunton at ilona.taunton@nelac-institute.org if you have any questions.

A Closer Look at EPA’s Office of Research and Development Laboratory Research Facilities

By Michaela Burns, ORAU student contractor, EPA, Office of Research and Development, Science Communications

From John Snow and the Broad Street Pump to chlorinated drinking water in Jersey City, NJ, protecting the environment has been a core public health function. While the public health community in the US no longer faces large-scale cholera outbreaks, environmental protection remains crucial to ensuring healthy communities and a clean environment.

A critical component of protecting the environment is having the scientific information and technology to measure exposure, assess impacts and mitigate risk. The US Environmental Protection Agency (EPA)’s Office of Research and Development (ORD) provides scientific research and technology that is the foundation of decisions to better protect public health and the environment.

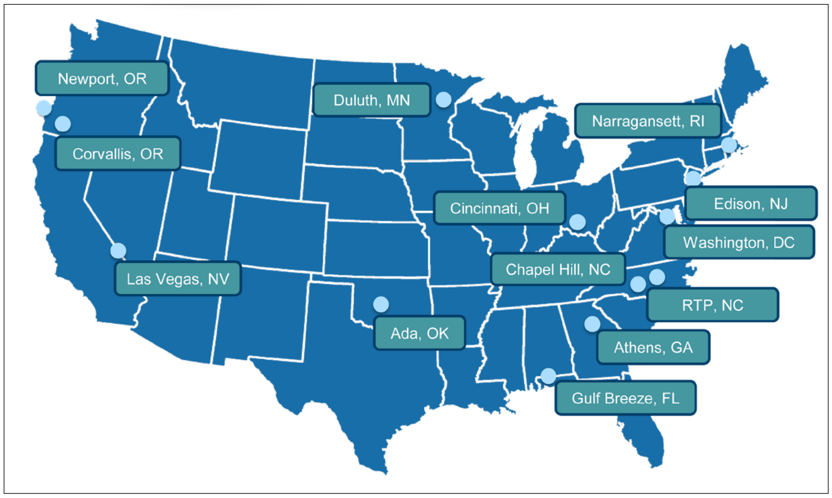
ORD’s research is organized into several priorities: safe and sustainable water resources; air quality; chemical safety evaluation and risk assessment; homeland security; and sustainable and healthy communities. ORD works closely with EPA’s regulatory offices, states and communities that use and need its research to identify the most important environmental health challenges facing the nation. Research plans are then created to address these challenges.

EPA ORD Laboratory Research Facilities

ORD scientists and engineers work in laboratories and centers located in 13 facilities across the country. ORD laboratory research facilities house world-class research organizations that provide research used at the local, regional, national and international levels. Scientists and engineers at these facilities play a major role in engaging local communities in science. Below are six of ORD’s most geographically-significant research facilities.

Narragansett, Rhode Island

EPA's Narragansett, Rhode Island laboratory research facility focuses on the ecology of oceans, estuaries, and watersheds, and the effects of human activities on that ecology. The laboratory contributes to the local economy in Narragansett and the surrounding region, and is an active participant in the local community. Projects conducted there include working with communities to prepare for rising sea levels and more frequent storms. To help lessen coastal erosion, EPA researchers are testing options for creating "living shorelines," which use plants, sand and rocks to provide natural shoreline protection. Investigators also conduct innovative research to assess and predict the risks of human activities to near-coastal waters and their watersheds, develop tools to support resilient watersheds and water resources, inform decisions about sustainable management of nutrients, and link environmental conditions to the health and well-being of people and society.



EPA ORD conducts research at 13 laboratory research facilities throughout the US.

Gulf Breeze, Florida

EPA's research facility in Gulf Breeze, Florida focuses on the impact of human-made stressors on Gulf Coast ecosystems and the impact of those stressors on public and environmental health. Gulf Breeze scientists are leaders in developing ecosystem models to inform watershed management decisions, and experimental and modeling approaches for predicting the toxicity of chemicals on wildlife populations. For example, ongoing research includes investigating the links between stressors such as agricultural runoff and low oxygen levels or hypoxia in the Gulf of Mexico that create areas called "dead zones." Scientists use a unique 14,000 square-foot wet laboratory to evaluate the impact of stressors on freshwater and saltwater species under controlled conditions. Laboratory staff also participate in ecological crisis response—including hurricanes and oil spills—with expertise in methods development, survey design, data analysis and interpretation.

Research Triangle Park, North Carolina

EPA's laboratory in Research Triangle Park (RTP), North Carolina is one of the Agency's largest research facilities. The facility researches decontamination technology, computational toxicology, how humans and other species are exposed to pollutants, and the health effects of air pollution and chemical contaminant exposure using both experimental models and clinical and epidemiological approaches. The RTP facility has one of the few large aerosol wind tunnel facilities in the nation, a unique facility to evaluate the health effects of inhaled pollutants. Researchers at the RTP facility are also engaged in community-based research, such as the Village Green project that installs air monitoring benches across the country. Once the bench is installed, anyone can go online and view the data to learn more about air quality in their community.

Cincinnati, Ohio

EPA's Cincinnati, Ohio, facility conducts a variety of research to manage chemical risks, clean up hazardous sites and protect water quality. Recently, researchers provided technical assistance to Flint, Michigan during the water contamination crisis; EPA scientists developed pipe rigs for corrosion control studies at Flint's water treatment plant and then trained representatives from Michigan Department of Environmental Quality and the City how to conduct

the studies. ORD scientists also provided sampling guidance, data management and modeling support, expertise in disinfection and flushing programs, and used EPA Cincinnati's solids and surface laboratory to analyze lead pipe scales and the effects of pipe corrosion. EPA is also working with local community groups to develop water quality monitoring, modeling, and management practices.

Duluth, Minnesota

The EPA Duluth facility is focused on how water quality changes can affect human health. ORD scientists predict and assess the effect of chemicals, bacteria and land use changes on Great Lakes water quality, freshwater species and other freshwater resources in the United States. Scientists conduct this research at a unique facility where numerous sentinel freshwater species are grown in Lake Superior-sourced water so stressor-effects can be evaluated under controlled conditions. In addition, scientists in Duluth are working to engage the community by educating students on the impact of human activities on Lake Superior and the St. Louis River Corridor.

Ada, Oklahoma

The Robert S. Kerr Environmental Research Center in Ada, Oklahoma is a major ORD laboratory research facility that conducts groundwater, subsurface contaminant remediation and ecosystem restoration research. The Ada facility includes laboratories, field equipment and test wells that investigate groundwater contaminant transport, and develop and assess technologies for remediating groundwater contamination. Ada ORD scientists have developed a method to estimate the potential for pollutant contamination of drinking water wells. The facility also provides technical support to state and local government decision-makers on groundwater and subsurface contamination issues. Ada scientists engage the general community by mentoring local students at East Central University and participate in local events such as Water Fest, an annual interactive education event for fifth graders.

Conclusion

EPA's ORD research laboratories produce data that inform decision-making critical to protecting human health and the environment. The laboratories possess research capabilities that best allow them to address geographically-based environmental issues and advance different areas of science. ORD shares its research findings and tools at conferences and webinars, and collaborates with outside organizations through research agreements, such as a Memorandum of Understanding (MOU) or a Cooperative Research and Development Agreement. For example, EPA and APHL currently have an MOU to better facilitate communication and partnership between EPA and public health laboratories. In addition, ORD's research laboratories are collaborating with communities on local environmental challenges and contributing research to help local decision makers. Through community engagement, outreach and targeted research, EPA is leading innovative science in communities throughout the country and worldwide.

Learn more online about the EPA ORD, its facilities and research programs.

Water Research Foundation Focuses in on Poly- and Perfluoroalkyl Substances in Water

Megan Karklins, content manager, Water Research Foundation

About Poly- and Perfluoroalkyl Substances

Poly- and perfluoroalkyl substances (PFAS)—also commonly referred to as perfluorinated chemicals or PFCs—are a group of anthropogenic chemicals with past and current uses in industrial processes and consumer products.

No federal regulations explicitly limit PFAS in water, however several actions have been taken at the federal and state levels:

- In 2016, the EPA set provisional health advisory levels for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) at 0.4 and 0.2 micrograms per liter, respectively.
- On November 1, 2017, New Jersey announced plans to become the first state to set formal maximum contaminant levels and require statewide testing of public drinking water systems for PFOA and perfluorononanoic acid (PFNA).
- On December 12, 2017 the Fiscal Year 2018 National Defense Authorization Act was signed into law, which includes the first ever nationwide health study on the impact of PFAS in drinking water.
- In late 2017, a New Jersey panel of scientists recommended that the state impose limits on PFOS.
- Many other states have their own drinking water and groundwater guidelines to limit PFOA and PFOS, including Minnesota and North Carolina.

Water Research Foundation to Create PFAS Focus Area

In December 2017, the Water Research Foundation's Board of Directors voted to add a new Focus Area relating to PFAS in water. The Focus Area Program identifies important subscriber issues and solves them with a targeted, multi-year research response. The PFAS Focus Area may evaluate one or more of these issues:

- Emerging and unidentified PFAS
- Vulnerability of waters to PFAS and identification of sources and hotspots
- Management alternatives for PFAS
- Behavior, fate, and transport of PFAS in treatment
- Treatment and removal of PFAS

The aqueous, film-forming foam used to fight fires, is a common source of PFAS.

Research projects and RFPs for the new PFAS Focus Area will be announced later this year. There will be opportunities to submit proposals as well as participate in the projects.

Contact

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Water Research Foundation and Water Environment & Reuse Foundation have joined forces! The integrated organization represents the evolution of water research issues, the overlap between water and wastewater, and efficiencies to be gained through a consolidated research program.

Learn More about PFAS

Access the Water Research Foundation's existing resources on PFAS to learn more about this issue:

- Treatment Mitigation Strategies for Poly- and Perfluorinated Chemicals (project #4322), includes a report and archived webcast, contains a detailed literature review on PFAS as well as results of an in-depth treatment study conducted on waters from 13 treatment plants in the United States.
- State of the Science document on PFAS based on this work and other references.