



# Per- and Polyfluoroalkyl Substances and DOE

Presentation for the Analytical Services Program

Ashley Ruocco, AU-21  
August 18, 2021





# Per- and Polyfluoroalkyl Substances (PFAS) and DOE

- DOE is aware that PFAS have been discharged as a chemical agent in a fire suppression product - Aqueous Film Forming Foam (AFFF).
- Beyond AFFF use, there may be other current or past uses of PFAS in DOE operations and processes that have resulted in releases to the environment.
- Of particular importance for DOE, PFAS were used in uranium processing operations.
- The Office of Environment, Health, Safety and Security (AU) has been working with DOE Programs and sites on a **voluntary and collaborative basis** to better understand and characterize the extent of PFAS issues across the complex, and to provide support to sites and leadership.



# DOE PFAS Working Group

- Established in Summer 2019 by AU-21
- Comprised of environmental and analytical experts from across the Complex (available only to DOE Federal/Contractor staff)
- Meets bi-monthly via webinar
  - Updates from AU-21 – General, Legislative, Training Opportunities
  - Highlighted Presentation - DOE Complex or another Federal Agency
  - Open Discussion
- PFAS SharePoint (available only to DOE Federal/Contractor staff)
  - Webinar files
  - Weekly 'In the News' files
  - Interagency resources



# PFAS Research at DOE

- **Fermi National Accelerator Laboratory** (FNAL) in Illinois conducting research on the degradation of PFAS in water via high power, energy-efficient electron beam accelerator.
- **Pacific Northwest National Laboratory** (PNNL) in Washington created a PFAS capture probe that is tailored for highly selective analyte recognition and detection which can also be used for quantification. PNNL's capture and sensor efforts were patented. PNNL is also pursuing a research focus area on PFAS destruction.
- **Office of Environmental Management** (EM) funds additional research projects through the **Consortium for Risk Evaluation with Stakeholder Participation** (CRESP). CRESP researchers are working on more efficient treatment and disposal activities.



# PFAS Coordination at DOE

- AU, EM, National Nuclear Security Administration (NNSA), and Office of Science coordinate on a regular basis regarding PFAS-related work, initiatives and next steps.
- Interagency coordination with Environmental Protection Agency, Department of Defense, National Aeronautics and Space Administration, and White House interagency working groups.



# PFAS Information Sharing

- Recent PFAS Surveys
  - EM and NNSA issued a survey regarding PFAS use and monitoring at sites December 2020-February 2021.
  - AU distributed the survey to the PFAS Working Group members for voluntary participation.
  - Compiling data for a better understanding of site status and DOE as a whole.
- Annual Site Environmental Reports



# PFAS-related DOE Documents

- Operating Experience Level 3 Document (September 2019): [PFAS Awareness](#)
- Operating Experience Summary: (March 2020): [Emerging Contaminants in Groundwater at BNL](#)

Office of Environment, Health, Safety and Security  
Operating Experience Level 3

OE-3: 2019-04 September 2019

### Per- and Polyfluoroalkyl Substances (PFAS) Awareness

**PURPOSE**  
This Operating Experience Level 3 (OE-3) document provides information about emerging contaminants referred to as per- and polyfluoroalkyl substances (PFAS). PFAS is a class of Safe Drinking Water Act (SDWA) contaminants.

In May 2016, the Environmental Protection Agency (EPA) issued a new drinking water Lifetime Health Advisory (LHA) for two types of PFAS chemicals: perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA). The new drinking water LHA is 70 parts per trillion (ppt) for PFOS and PFOA, individually or combined. There are more than 3,000 man-made fluorinated organic compounds. For context, one ppt is equivalent to one drop of water in 20 Olympic-sized swimming pools.

**BACKGROUND**  
PFAS are manufactured fluorinated organic chemicals commonly used in household items such as non-stick cookware, clothing, shoes, furniture, and carpets. PFAS chemicals are also used in firefighting, most notably in Aqueous Film Forming foam (AFFF), a firefighting agent used to suppress fuel fires. AFFF contains both PFOS and PFOA and has been extensively used by firefighters in training and equipment testing.

The understanding of potential drinking water impacts from PFAS has significantly increased over the past decade. This class of chemicals started to get publicity in 2001 and 2002 due to water contamination from the Washington Works Plant located outside of Parkersburg, West Virginia. A class-action lawsuit against DuPont due to water contamination generated additional publicity. In 2006, DuPont, along with other manufacturers such as 3M, agreed to principally phase out the production of PFOA and PFOS.

**REGULATORY STATUS**  
Currently, PFAS is undergoing extensive regulatory scrutiny by Federal, State, and public-interest organizations.

Although there is not yet Federal regulation of these compounds, many states have introduced and/or established more stringent health advisory limits for individual compounds.

**Third Unregulated Contaminant Monitoring Rule (UCMR3):** Due to escalating concerns, six PFAS compounds were included in EPA's final UCMR3 in May 2012. This inclusion triggered monitoring at major water systems between January 2013 and December 2015. As typical for the UCMR3, EPA regularly released the UCMR3 monitoring data to the public, starting in late 2013.

**EPA's 2009 Provisional and 2016 Revised Health Advisories (HAs):** In 2009, EPA established provisional HAs for PFOS at 200 ppt and PFOA at 400 ppt. These two numbers served as the benchmark during the UCMR3 monitoring period, which found relatively few exceedances of PFOS and PFOA.

In May 2016, EPA released revised HAs for the sum of PFOA and PFOS at 70 ppt. This numerical reduction significantly increased the number of water systems impacted.

Office of Environment, Health, Safety and Security  
Operating Experience Summary

OES 2020-02 March 2020

### Emerging Contaminants in Groundwater at BNL

**Introduction**  
This Operating Experience Summary provides information about per- and polyfluoroalkyl substances (PFAS) that have been identified in drinking water and groundwater at the U.S. Department of Energy's (DOE's) Brookhaven National Laboratory (BNL) on Long Island, New York (NY). Due to soil and groundwater contamination from legacy chemical and radionuclide releases, in 1989 the BNL site was included on the National Priorities List (NPL) under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The DOE, U.S. Environmental Protection Agency (EPA) and NY State Department of Environmental Conservation (NYSDEC) entered into a Federal Facilities Agreement to coordinate environmental remediation activities at the site.

PFAS are a family of more than 4,500 man-made fluorinated organic chemicals that have been produced since the mid-20th century. They have been used for various purposes such as Teflon®-coated cookware, stain-resistant carpets, water-resistant textiles, food wrappers, and firefighting foam. PFAS has also been used in operational processes such as metal plating, uranium processing, and highly corrosive applications.

Long Island's drinking water is obtained from groundwater withdrawn from an EPA designated sole source aquifer system. Long Island's groundwater is highly vulnerable to contamination as the aquifers are composed of highly permeable sand and gravel. At BNL, because groundwater is encountered very close to the land surface (10 to 50 feet), chemical releases can have almost immediate impacts to groundwater quality.

The source of PFAS contamination at BNL is linked to the historical use of aqueous film forming foam (AFFF) which is used to fight Class B (or fuel) fires.

**Background**  
From 2013 to 2015, water systems serving more than 10,000 customers began testing for PFAS under the Safe Drinking Water Act (SDWA). The SDWA's Third Unregulated Contaminant Monitoring Rule (UCMR-3) program included six PFAS compounds as emerging contaminants of concern.

Currently, there are no specific Federal or NY State drinking water standards for PFAS. In 2016, EPA established a Lifetime Health Advisory Level (HAL) of 70 ng/L (or 70 parts per trillion) for the individual or combined concentrations of two PFAS compounds: Perfluorooctane sulfonate (PFOS) and Perfluorooctanoic acid (PFOA). In December 2018, the NY State Drinking Water Quality Council recommended individual drinking water standards of 10 ng/L each for both PFOS and PFOA.

These proposed standards received 2,700 comments when published in the NY State Register in July 2019. They are expected to be finalized and published in 2020.

In March 2017, Suffolk County Department of Health tested water samples from BNL's potable water supply wells for the same six PFAS compounds monitored under UCMR-3. PFAS were identified in three out of five active water supply wells. The presence of PFAS was confirmed by analyzing multiple samples between 2017 and 2019. Although the combined PFOS and PFOA concentrations in the supply wells are typically less than the 70 ng/L HAL, individual PFOS concentrations in three of the wells routinely exceed the proposed 10 ng/L drinking water standard.

In 2018, routine PFAS testing was added to BNL's potable water monitoring program and samples are now tested for PFAS on a quarterly basis.



# Current PROPOSED Bills

(updated as of August 5, 2021)

– [H.R. 2467, PFAS Action Act of 2021](#)

- House passed on July 21, 2021; advanced to Senate on July 22.
- Requires EPA to take action under the Safe Drinking Water Act (SDWA), Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Clean Water Act (CWA), Clean Air Act (CAA), Solid Waste Disposal Act (SWDA), and Toxic Substances Control Act (TSCA) to address PFAS.

– [H.R. 3584/ Invest in America Act](#) (6/4/2021)

- Passed the House July 2, 2021. Directs EPA to issue National Primary Drinking Water Standards for PFAS, including, at a minimum, standards for PFOA and PFOS within 2 years. Also requires EPA to publish water quality criteria and effluent limitations under the Clean Water Act for “for each measurable perfluoroalkyl substance, polyfluoroalkyl substance, and class of such substances.”
- As of August 2, Senate version removed all PFAS regulatory provisions from House version. Provides \$10B in grants to address drinking water and wastewater utility infrastructure upgrades for emerging contaminants with focus on PFOS and PFOA.





# Current PROPOSED Bills

(updated as of August 5, 2021)

- National Defense Authorization Act for Fiscal Year 2022 (Senate Version)
  - Codifies the Department of Defense (DOD) PFAS Task Force;
  - Establish a deadline for the DOD to test for PFAS at all DOD installations;
  - Directs DOD to develop a remediation schedule to address PFAS contamination at military facilities; and
  - Requires DOD to produce a status report on PFAS remediation efforts at military facilities.
- [H.R. 3622 / Clean Water Standards for PFAS Act of 2021](#) (06/01/21)
  - Requires EPA to develop effluent limitations guidelines and standards and water quality criteria for PFAS under the Clean Water Act
- [H.R. 3267 / Protect Drinking Water from PFAS Act](#) (5/20/21)
  - Amends the Safe Drinking Water Act to require EPA to publish a maximum contaminant level goal and promulgate a national primary drinking water regulation for total PFAS
- [S. 984 / Break Free From Plastic Pollution Act of 2021](#) (3/25/21)
  - Amends Solid Waste Disposal Act to prevent plastic pollution from entering animal, human food chains and waterways; defines PFAS as a “toxic substance”



# Federal Regulatory Activity

EPA under significant pressure to set drinking water standards and update guidance on disposal

- Agency for Toxic Substances & Disease Registry (ATSDR) [finalized a PFAS toxicological profile](#) endorsing much stricter minimal risk levels (MRLs) than EPA's combined drinking water HAL of 70 ppt, for PFOA and PFOS.
- Senate Majority Leader [called on EPA](#) to set immediate standards, consider regulation of PFAS as a chemical class, and phase out “non-essential PFAS uses.”
- [Sen. Shaheen op-ed](#) called on Administration to make PFAS a priority.
- A group of 30 environmental advocacy organizations [underscored EPA's recommendation of interim storage of PFAS](#) for 2 to 5 years pending development of technologies capable of successful PFAS destruction. (Public Comments on [EPA's December 2020 Interim Disposal Guidance](#))
- [Congressional PFAS Task Force called on EPA](#) to finalize a national drinking water standard for PFOA and PFOS, Clean Air Act and Clean Water Act authorities to restrict PFAS release into the environment, designate PFAS and PFOA as hazardous substances under CERCLA, and revise groundwater cleanup standards, among other things.



# Federal Regulatory Activity

Action	Authority
EPA Council on PFAS (ECP)	<ul style="list-style-type: none"> <li>• Council of EPA senior leadership officials <a href="#">announced in April 27 memorandum</a> to collaborate on cross-cutting strategies, develop coordinated policies, and engage affected states, tribes, and communities.</li> <li>• Develop "PFAS 2021-2025 -Safeguarding America's Waters, Air and Land," a multi-year strategy to deliver critical public health protections.</li> <li>• Continue close interagency coordination to assist states, tribes and local communities faced with significant and complex PFAS challenges.</li> <li>• Work with all programs to maximize the impact of the EPA's funding and financing programs to support cleanup, particularly in underserved communities.</li> </ul>
EPA Interim PFAS Destruction and Disposal Guidance	<p>National Defense Authorization Act of 2020 directed EPA to publish interim guidance, to be updated every 3 years. EPA published its draft interim guidance on 12/22/20. The guidance:</p> <ul style="list-style-type: none"> <li>• Provides information on technologies that may be feasible and appropriate for the destruction or disposal of PFAS, and</li> <li>• Identifies needed and ongoing research and development activities, which may inform future guidance</li> </ul>
Safe Drinking Water Act	<p><b>Enforceable standard for PFOA and PFOS.</b> In March 2021, EPA <a href="#">kicked off a multi-stage regulatory process</a> to set drinking water standards for PFOA and PFOS.</p> <p><b>Draft Fifth Contaminant Candidate List.</b> On July 12, 2021, <a href="#">EPA announced the Draft Fifth Contaminant Candidate List (CCL 5)</a>. The draft CCL includes 3 chemical groups (per- and polyfluoroalkyl substances (PFAS)). EPA says it will evaluate scientific data on the listed groups, to inform any regulatory determinations. This would include thousands of PFAS on the list of chemicals for future regulation under the Safe Drinking Water Act.</p>



# Federal Regulatory Activity

Action	Authority
Clean Water Act	<b>Effluent Limitation Guidelines (ELGs)</b> Comment period closed May 17 on EPA's <a href="#">Advance Notice of Proposed Rulemaking</a> to identify industrial sources for potential regulation of PFAS through national ELGs.
Toxic Release inventory/Toxic Substances Control Act	<b>Three New PFAS added to the TRI.</b> In a <a href="#">June 3<sup>rd</sup> Final Rule</a> , EPA added three new PFAS chemicals to the TRI list. (Perfluorooctyl iodide, Potassium perfluorooctanoate and Silver (I) perfluorooctanoate. This action implements the statutory mandate in the National Defense Authorization Act for Fiscal Year 2020.
Comprehensive Environmental Response Compensation and Liability Act (CERCLA)	<b>No proposal to date.</b> EPA has moved CERCLA listing to “long term actions” under the Unified Regulatory Agenda, and is evaluating expansion of a future listing to include additional PFAS chemicals beyond PFOS and PFOA.



# State Regulatory Activity

States		Law/Regulation
New Jersey New York Ohio* Tennessee**	Virginia** Washington* West Virginia**	Drinking water limits
New Jersey (interim) Illinois*		Groundwater standards or limits
California Colorado* New Jersey	New York New Mexico	Classification of PFAS as toxic, hazardous, pollutant or a contaminant of concern
California Colorado* Illinois*	New York Texas*	Prohibit the use, manufacture and sale of Class B firefighting foam containing PFAS Chemicals or PPE.
Illinois* New York		Prohibit incineration of PFAS.

\* *Proposed*

\*\* *Studying/testing or authority to propose*



# DOE Next Steps

- Establish a coherent framework for approaching PFAS Complex-wide
- Continue collaborating across agencies, especially EPA and DoD
- Continue research on past uses at DOE
- Continue supporting DOE sites and National Laboratories
  - DOE PFAS Working Group



# Questions?

Ashley Ruocco

AU-21

301-903-7010

[Ashley.Ruocco@hq.doe.gov](mailto:Ashley.Ruocco@hq.doe.gov)