



Per- and polyfluoroalkyl substances (PFAS) Update

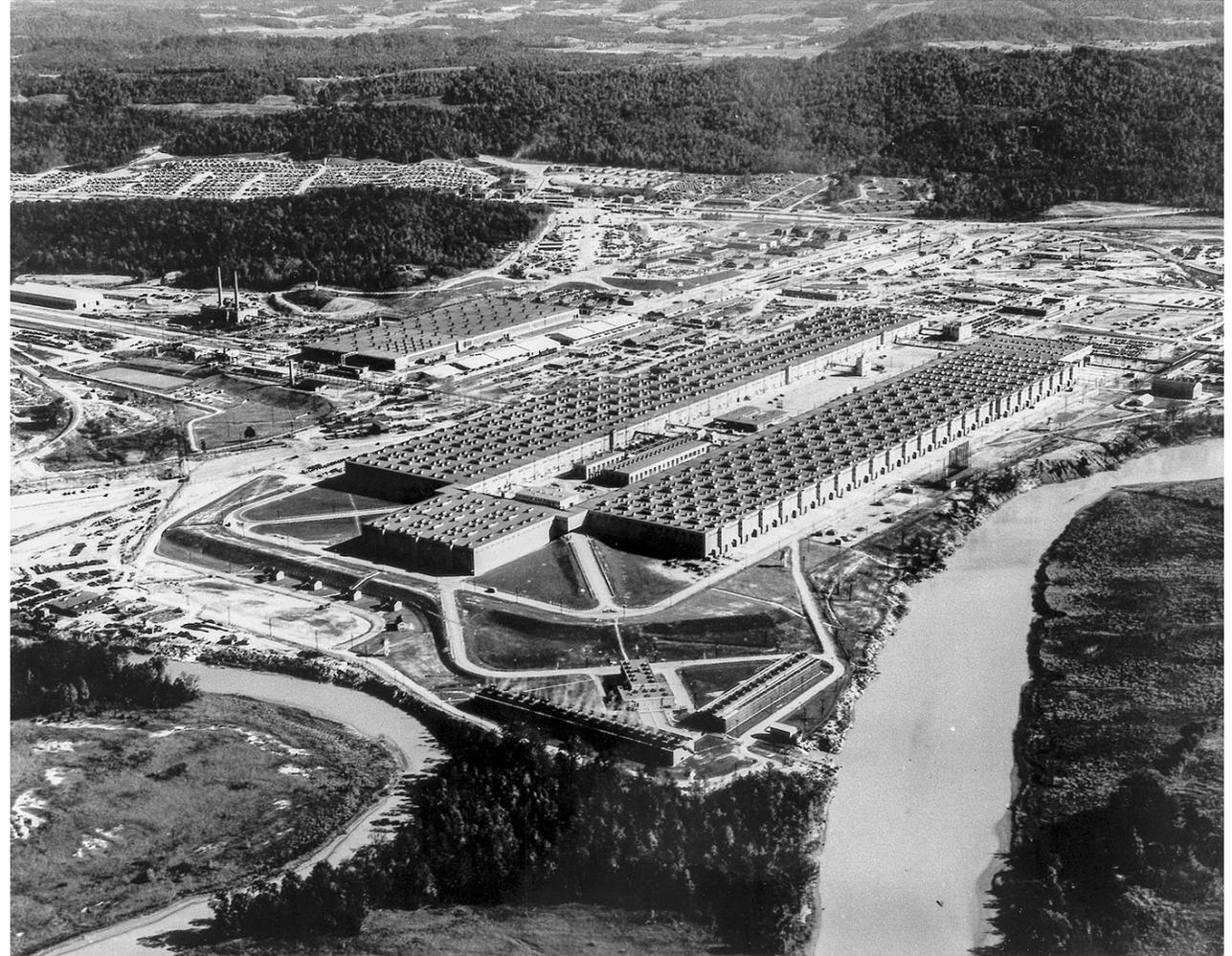
US Department of Energy (DOE)



Background: Uranium Separation and PFAS

PFAS were first produced on an industrial scale for use in uranium separation activities during the Manhattan Project.

- 1938 - Teflon® (polytetrafluoroethylene, PTFE) discovered by DuPont scientists
- Development of atomic bomb involved enrichment of U235 using gaseous UF₆ (highly corrosive)
- Teflon® and other liquid fluorocarbons found to be highly resistant to corrosion
- First (classified) industrial use of PFAS
- Declassified after the war, and widespread commercial use began in 1949



DOE PFAS Mission Statement

Protect human health and the environment by assessing and addressing PFAS at DOE sites while deploying the Department's scientific expertise to solve PFAS challenges

DOE is committed to:

- Coordinating with other agencies and working groups
- Staying informed on activities, updates and challenges related to PFAS contamination and regulation
- Continuing investigations and finding solutions for PFAS contamination at DOE sites



DOE Actions: Timeline



September 2019

DOE PFAS Work Group established

September 2019

Operating Experience Level 3 Document [PFAS Awareness](#), published

March 2020

Operating Experience Summary, [Emerging Contaminants in Groundwater at Brookhaven National Laboratory](#), published

December 2021

[DOE Guidance on Reporting PFAS-Containing AFFF Releases or Spills to the Environment](#) issued

November 2021

PFAS Coordinating Committee (PCC) established

September 2021

Deputy Secretary David Turk signed a [memorandum](#) addressing PFAS at DOE

↑
Ongoing
DOE
Research
↓

August 2022

[DOE PFAS Website](#) went live

August 2022

[PFAS Roadmap](#) released

November 2022

Initial Assessment Report



DOE Actions: Deputy Secretary Memorandum

Deputy Secretary David Turk issued a PFAS Policy Memorandum on September 16, 2021. The memo established the Department's initial framework for addressing PFAS.

- **Discontinuation of Aqueous Film Forming Foam (AFFF) except in emergencies:**
 - Any discharge to be contained/collected to the maximum extent
 - Fire personnel will be equipped with personal protective equipment
- **Storage and disposal:**
 - Sites may store AFFF on site as required for safety systems and lifesaving emergencies
 - Disposal of PFAS is suspended pending further guidance
- **Report** any PFAS release or spill to DOE HQ
- Establish a **PFAS Coordinating Committee (PCC)** to guide implementation of the memo's requirements





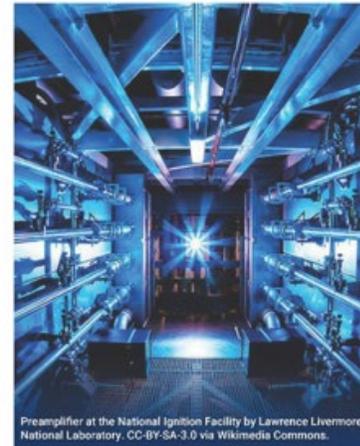
DOE Actions: DOE PFAS Roadmap



DOE Actions: PFAS Initial Assessment

DOE will release its *Initial Assessment of Per- and Polyfluoroalkyl Substances (PFAS) at Department of Energy Sites* on November 22, 2022.

Initial Assessment of Per- and Polyfluoroalkyl Substances (PFAS) at Department of Energy (DOE) Sites



Preamplifier at the National Ignition Facility by Lawrence Livermore National Laboratory. CC-BY-SA-3.0 via Wikimedia Commons.

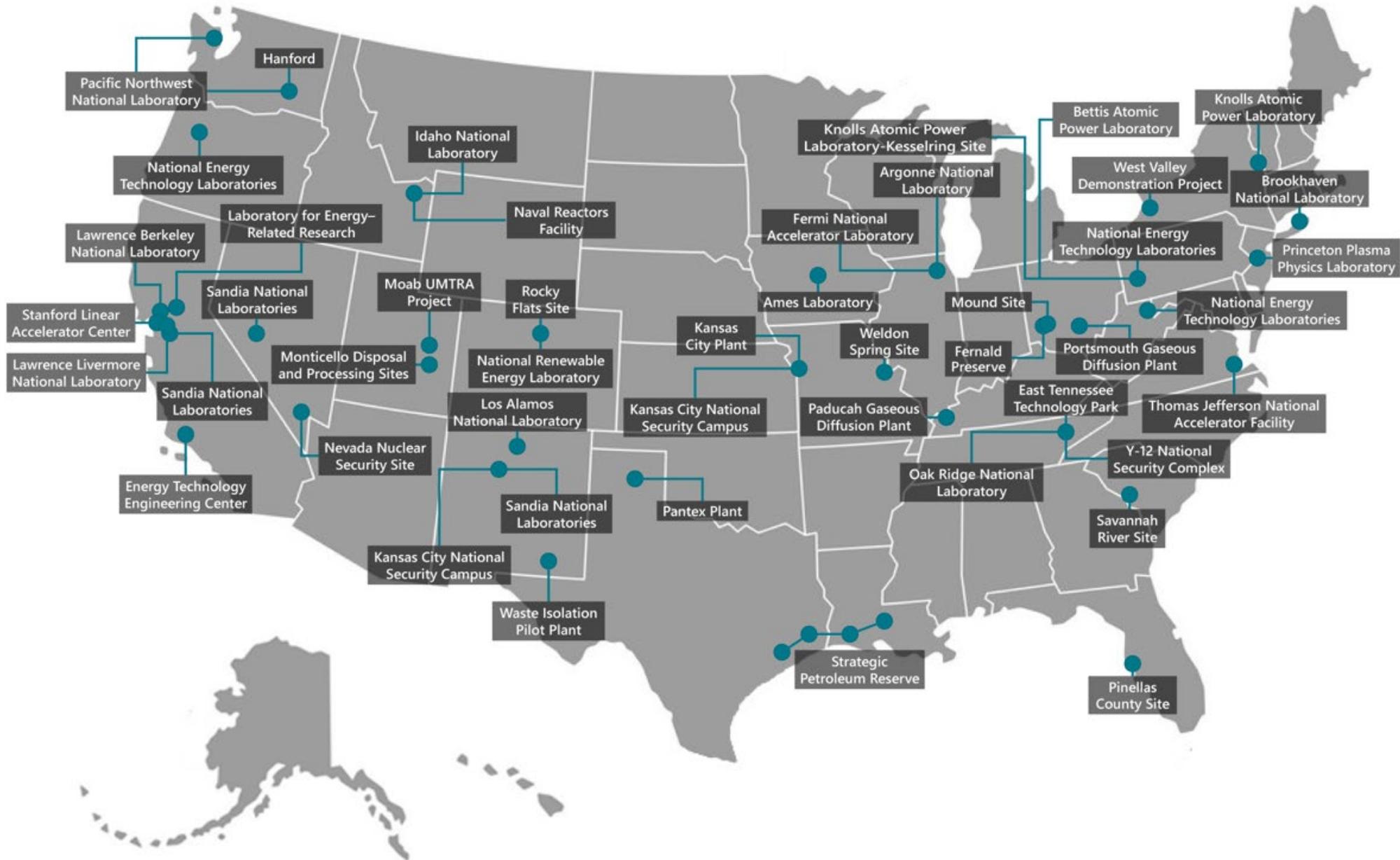


DOE Actions: PFAS Initial Assessment



- DOE program offices (EM, NE, NNSA, LM, SC, FECM, CESER, EE) conducted a survey of PFAS inventories, usage and existing historical information
- **Survey Objective-** To provide an initial understanding of PFAS use and presence at DOE sites, including:
 - Historical usage
 - Potential sources and inventories
 - Drinking water supply and sampling status
 - Regulator or other stakeholder inquiries and requests
 - Detections in environment
 - Routine monitoring programs
 - Potential or known off-site migration

Participating Sites in the DOE PFAS Survey



DOE Actions: PFAS Initial Assessment Key Takeaways



Drinking Water

- Most DOE sites surveyed are supplied by offsite public water systems
- PFOA/PFOS were detected in two on-site drinking water systems (Idaho and Brookhaven)
- DOE will soon have PFAS data on drinking water from the few sites that need to sample their on-site sources

Historical and Current Uses

- Many DOE facilities stored, used, and disposed of PFAS-containing products in the past, and several continue to manage inventories of PFAS on-site
- Identifying historical and current PFAS inventories continues as DOE better understands its past and present inventories

DOE Actions: PFAS Initial Assessment Key Takeaways



Occurrence in the Environment

- A limited number of sites have sampled for PFAS
- Most sites that have sampled for PFAS have detected PFAS
- Groundwater is the primary media sampled for PFAS
- Four sites have active PFAS monitoring programs (BNL, LANL, Rocky Flats, SRS)

Regulatory and Stakeholder Engagement

- Engagement has resulted in:
 - additional records searches
 - discrete environmental sampling events
 - establishment of environmental monitoring programs.



DOE Actions: Ongoing Research

■ Examples of Detection Research

- **Argonne National Laboratory** in Illinois is developing a field-effect transistor platform for rapid electronic detection of PFAS in water, including the use of AI/machine learning for the design of molecular probes toward selective detection and separation of PFAS.
- **Pacific Northwest National Laboratory** in Washington created a PFAS capture probe that is tailored for highly selective analyte recognition and detection which can also be used for quantification.

■ Examples of Destruction Research

- **Brookhaven National Laboratory** in New York is developing a plasma-based technique to destroy PFAS and related components in water.
- **Fermi National Accelerator Laboratory** in Illinois conducting research on the degradation of PFAS in water via high power, energy-efficient electron beam accelerator

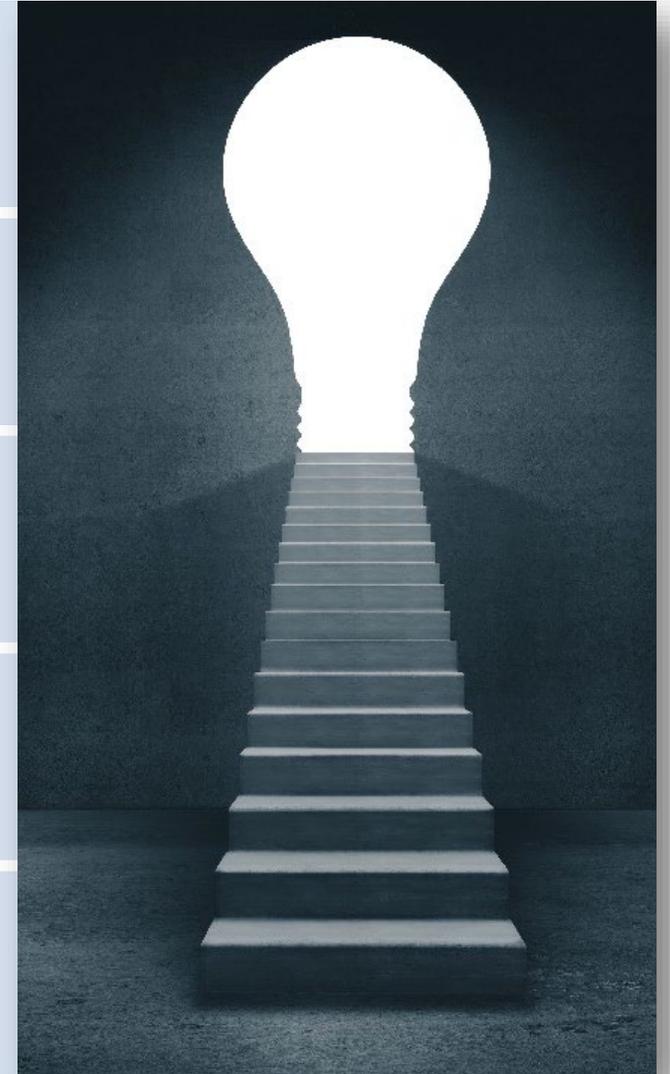


Next Steps

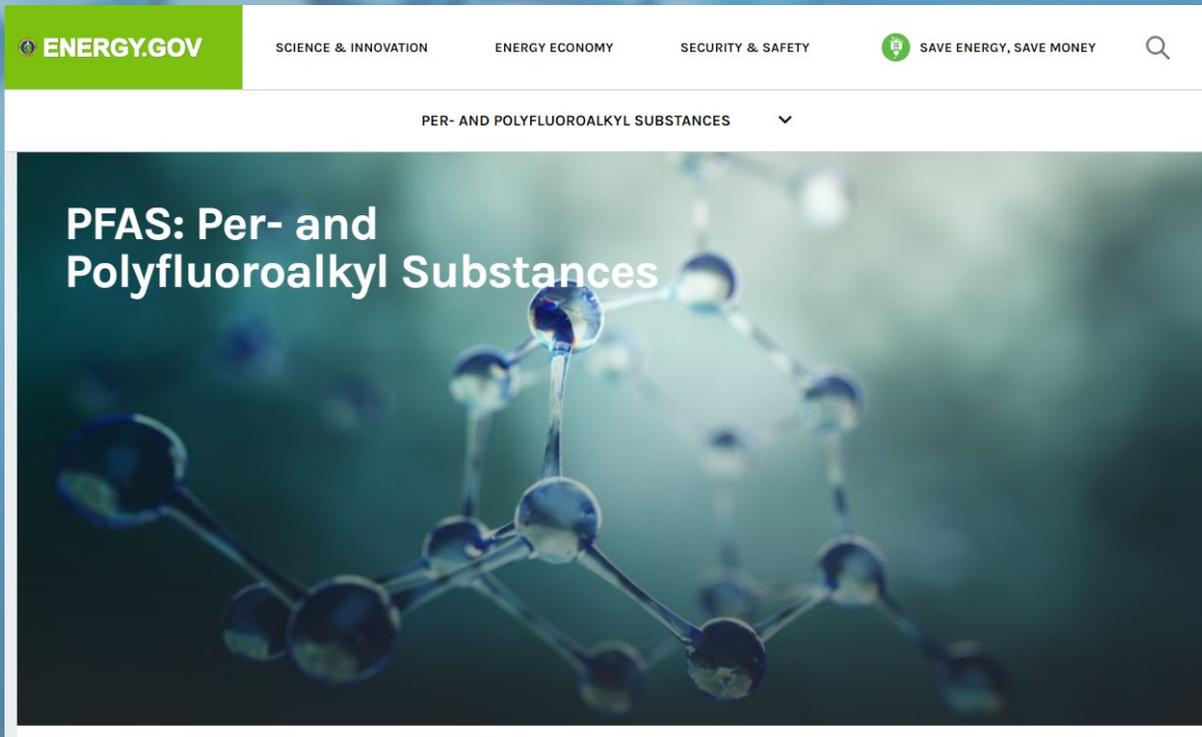


Implement DOE Commitments on PFAS

Understand	Gather and analyze PFAS data to fill knowledge gaps and inform site-specific risk management
Manage and Protect	Take steps to protect DOE workers, the public and the environment
Advance Solutions	Expand the body of knowledge and develop technological solutions to address PFAS issues
Communicate and Collaborate	Inform and engage stakeholders



PFAS Resources



[DOE PFAS Website](#)



DOE PFAS Mailbox:

*Contact us with
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