

# PFAS Strategic Roadmap:

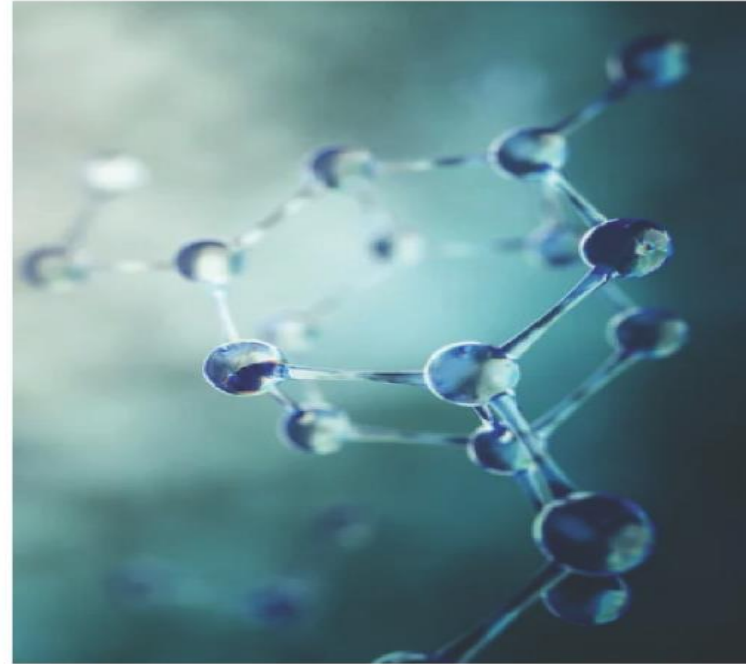
## DOE Commitments to Action 2022-2025



**CAC**

**Sept 8, 2022**

**Bob Gordon**



## Major PFAS Announcements across the Federal Government

Oct 2021: White House PFAS Fact Sheet

( <https://www.whitehouse.gov/briefing-room/statements-releases/2021/10/18/fact-sheet-biden-harris-administration-launches-plan-to-combat-pfas-pollution/> )

Oct 2021: EPA PFAS Roadmap

( <https://www.epa.gov/pfas/pfas-strategic-roadmap-epas-commitments-action-2021-2024> )

Aug 2022: Dept of Energy Roadmap

( <https://www.energy.gov/sites/default/files/2022-08/DOE%20PFAS%20Roadmap%20August%202022.pdf> )



BRIEFING ROOM

# FACT SHEET: Biden-Harris Administration Launches Plan to Combat PFAS Pollution

OCTOBER 18, 2021 • STATEMENTS AND RELEASES

*Eight Agencies Announce Steps, including New EPA Roadmap, to Take Comprehensive Approach to Addressing PFAS & Advancing Clean Air, Water, and Food*

President Biden believes every American deserves to breathe clean air, drink clean water, and eat safe food — free of chemicals and pollutants that harm the health and wellbeing of children, families, and communities. Today, to advance that commitment, the Biden-Harris Administration is announcing accelerated efforts to protect Americans from per- and polyfluoroalkyl substances (PFAS), which can cause severe health problems and persist in the environment once released, posing a serious threat across rural, suburban,



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# PFAS Strategic Roadmap: EPA's Commitments to Action 2021-2024

On October 18, 2021, EPA Administrator Michael S. Regan announced the Agency's PFAS Strategic Roadmap—laying out a whole-of-agency approach to addressing PFAS.

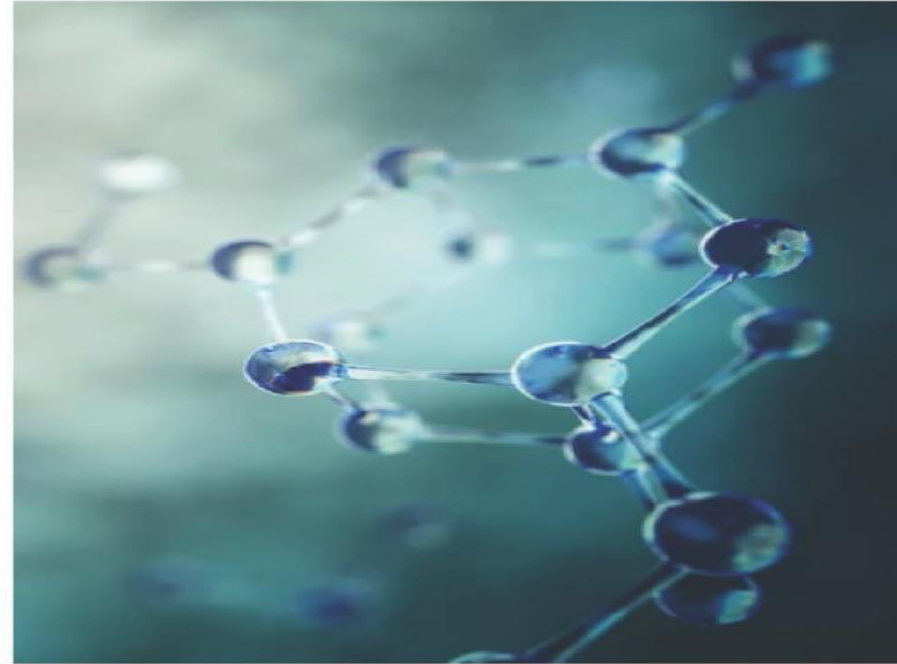
The roadmap sets timelines by which EPA plans to take specific actions and commits to bolder new policies to safeguard public health, protect the environment, and hold polluters accountable. The actions described in the PFAS Roadmap each represent important and meaningful steps to safeguard communities from PFAS contamination. Cumulatively, these actions will build upon one another and lead to more enduring and protective solutions.

- Read an overview of the PFAS Strategic Roadmap and learn more about key actions below, or read the complete [PFAS Strategic Roadmap \(pdf\)](#) (1.46 MB) .
- [Learn about EPA actions and accomplishments since January 20, 2021.](#)

### Lea en español

Infórmese acerca del [Mapa estratégico sobre PFAS: Los compromisos de la EPA para tomar acción en 2021-2024](#)

# PFAS Strategic Roadmap: DOE Commitments to Action 2022-2025



## DEPARTMENTAL PILLARS AND GOALS

All work at DOE begins with a fundamental commitment to protecting human health and the environment. This commitment guides the Department's approach to PFAS, which rests on four pillars and their associated goals:

- **Understand.** Develop information concerning PFAS uses and environmental releases to characterize and assess the Department's potential liabilities and risks.
- **Manage and Protect.** Safeguard the health and well-being of our employees, the public, and the environment by minimizing exposure to PFAS and addressing PFAS releases.
- **Advance Solutions.** Leverage expertise at DOE's National Laboratories and collaborate with research partners to enhance PFAS knowledge and develop technological solutions.
- **Communicate and Collaborate.** Engage with regulators, Tribal nations, local communities, and stakeholders to ensure transparency on DOE's PFAS progress and develop effective PFAS strategies.



## OBJECTIVES AND PLANNED ACTIONS

The Department's supporting objectives and actions flow directly from the four pillars of the Roadmap.

### Pillar 1: Understand

**Goal: Develop information concerning PFAS uses and environmental releases to characterize and assess the Department's potential liabilities and risks**

- **Obj. 1** – Understand the Manhattan Project and Cold War-era sources and volumes of PFAS used and disposed of, with initial focus on uranium processing operations.
- **Obj. 2** – Assess Aqueous Film Forming Foam (AFFF) releases to the environment from fire suppression systems, firefighter training operations, and emergencies resulting in AFFF use.
- **Obj. 3** – Identify other PFAS uses and disposal activities associated with research, operations, and equipment maintenance.
- **Obj. 4** – Understand the presence of PFAS in drinking water and the environment.
- **Obj. 5** – Catalogue and track current PFAS inventories and uses.

- Action 1.1: Publish "Initial Assessment of PFAS at DOE Sites" (Initial Assessment Report). (Supports all objectives)

*This report is DOE's first broad investigation into the presence of PFAS at DOE sites. Results from this report will inform future data collection activities.*

- Completion date: 4th quarter Fiscal Year (FY) 2022.

- Action 1.2: Publish DOE guidance on historical and current use searches. (Supports all objectives)

## Pillar 2: Manage and Protect

**Goal: Safeguard the health and well-being of our employees, the public, and the environment by minimizing exposure to PFAS and addressing PFAS releases**

- **Obj. 1** – Minimize risks to the DOE workforce from exposure to PFAS.
- **Obj. 2** – Reduce potential risk to the public and environment.
- **Obj. 3** – Restrict procurement and use of PFAS-containing products and identify alternatives.

- **Action 2.1:** Provide alternative drinking water supply to DOE sites where PFAS is detected in on-site drinking water at concentrations exceeding federal or state regulatory limits. (Supports Objective 1)

*The health of our workforce is a fundamental priority for DOE. Action 2.1 is DOE's response to drinking water information collected as part of Action 1.3.*

- Completion dates: Immediately as needed as drinking water data (Action 1.3) become available.

### Remediation at Brookhaven National Laboratory (BNL)



Photo: Installation of underground piping connecting groundwater extraction wells to a PFAS treatment system at BNL.

(Supports Objectives 1 and 2) BNL began addressing PFAS following its detection in three BNL potable water supply wells in 2017. The site has worked closely with regulators and the surrounding community to understand and address PFAS contamination. Recently, a Time Critical Removal Action project was developed to address groundwater contaminated with PFAS that is migrating downgradient of the current and former Firehouse areas. Two groundwater treatment systems are under construction to capture and treat the high concentration plume segments associated with these two source areas. The contaminated water, withdrawn from the aquifer via a series of extraction wells, will be treated using granular activated carbon. The treated water will be discharged into two existing recharge basins. A network of monitoring wells will be installed to monitor the performance of the treatment system and track remediation of the plumes over time.

- **Action 2.2:** Establish requirements to restrict any non-emergency use of PFAS-containing AFFF, suspend disposal actions unless approved by the head of the program element, require PPE for operations with known PFAS exposure, and report PFAS spills and releases. (Supports Objectives 1 and 2)

*This Action implements the DOE PFAS Policy Memorandum.*

- Completion dates: Memorandum with requirements issued September 2021; reporting guidance issued December 2021.



**Pillar 3:  
Advance Solutions**

**Goal: Leverage expertise at DOE's National Laboratories and collaborate with research partners to enhance PFAS knowledge and develop technological solutions**

- **Obj. 1** – Leverage the expertise of DOE National Laboratories and research partners to identify and advance research objectives.
- **Obj. 2** – Coordinate with Federal agencies and research partners to solve challenges.
- **Obj. 3** – Conduct research and adapt resultant strategies, as needed.
- **Obj. 4** – Support Department-wide collaboration to enable deployment of solutions for PFAS-related challenges.

- Action 3.1: Publish a PFAS Research Plan that identifies research gaps and establishes DOE research priorities to ensure a coordinated effort across DOE laboratories and other federal research partners. (Supports Objectives 1, 2, and 4)

*Enable coordination and provide direction for DOE's research and development activities led by the national laboratories and other research institutions focused on evaluating promising technological approaches for PFAS detection, separation, destruction, and disposal. Identify deployment opportunities for promising technologies.*

- Completion dates: Initial research plan published 1st quarter FY 2023, with next update by 1st quarter 2025.

**Pillar 4:  
Communicate  
and Collaborate****Goal: Engage with regulators, Tribal nations, local communities, and stakeholders to ensure transparency on DOE's PFAS progress and develop effective PFAS strategies**

- **Obj. 1** – Develop publicly-available resources to provide timely updates on Departmental progress in assessing and managing PFAS risks.
- **Obj. 2** – Ensure effective engagement with community stakeholders, Tribal, state and local governments, regulatory entities, and others.

- Action 4.1: Release a publicly available platform to serve as a central hub and resource center. (Supports Objective 1)  
*Establish a centralized DOE PFAS website conveying Departmental information including policies, practices, and updates on engagement opportunities.*
  - Completion date: 4th quarter FY 2022.
- Action 4.2: Develop informational materials conveying DOE-wide and site-specific information, including updates on PFAS developments. (Supports Objective 1)  
*Identify content to provide timely, substantive updates on PFAS developments at the Department to support site-level and corporate communications efforts.*
  - Completion date: Ongoing.
- Action 4.3: Identify opportunities at the enterprise and site level to discuss PFAS issues with Tribal, state and local governments, and interagency and external stakeholders. (Supports Objective 2)

## **ATTACHMENT 2: RESEARCH AND DEVELOPMENT EFFORTS**

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1. In Illinois, Argonne National Laboratory (ANL) has developed the Ecological Screening Values (ESVs) for eight PFAS for surface water and soil for the Air Force and other DOD services. ESVs were developed for ecological receptors with the participation of EPA, Army, Navy, and Air Force ecological risk experts. An Artificial Intelligence (AI) workflow using deep learning methods has also been developed for PFAS toxicity predictions and tested for 8163 PFAS. ANL is currently 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. These efforts are ongoing.
2. ANL is also pursuing a design of treatment train to combine multiple ANL technologies including selective adsorbent sponges for PFAS capture, resin-wafer electrodeionization for waste-stream reduction, and low-temperature atmospheric pressure plasma for decontamination and destruction of PFAS in an adsorbent medium. The selective adsorbents used in treatment train build off two patented Argonne technologies: (i) the OleoSponge and (ii) a new class of nanostructured adsorbents called xerogels. Both technologies afford direct control over the adsorbent surface chemistry to specifically target PFAS, but individually cover a range of physical characteristics such as surface area and porosity to enhance separation performance metrics such as adsorption capacity. Research continues on the development of additional PFAS selective sensors and sorbents. Research on synthesis of catalysts using atomic layer deposition to degrade PFAS was also recently funded as a collaborative effort. These efforts are ongoing.
3. At Fermi National Accelerator Laboratory in Illinois, research is being conducted on the degradation of PFAS in water via a high power, energy-efficient electron beam accelerator. Results to date have established that an electron beam is effective at breaking down PFAS compounds and work continues on how to best incorporate this technology in water treatment. These efforts are ongoing.
4. At Pacific Northwest National Laboratory (PNNL) in Washington, DOE 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. PNNL is part of a recent DOD Environmental Security Technology Certification Program project award with ARCADIS and New Jersey Institute of Technology on "Field-Scale Demonstration of a Novel Real-Time Sensor for PFAS," where PNNL is working on detecting six different PFAS molecules using the PFAS sensor. These efforts are ongoing.
5. BNL is developing a plasma-based technique to destroy PFAS and related components in water. The main advantage of the plasma-based technique is that the energy requirements are very favorable. BNL is also supporting the Fermi National Accelerator Laboratory effort that is exploring an electron-beam technique. These efforts are ongoing.



# DOE PFAS Research Plan: Research Needs and Current National Lab Activity

Aug 2022