U.S. Government Accountability Office

PERSISTENT CHEMICALS: DOE Should Complete Efforts to Review PFAS Use

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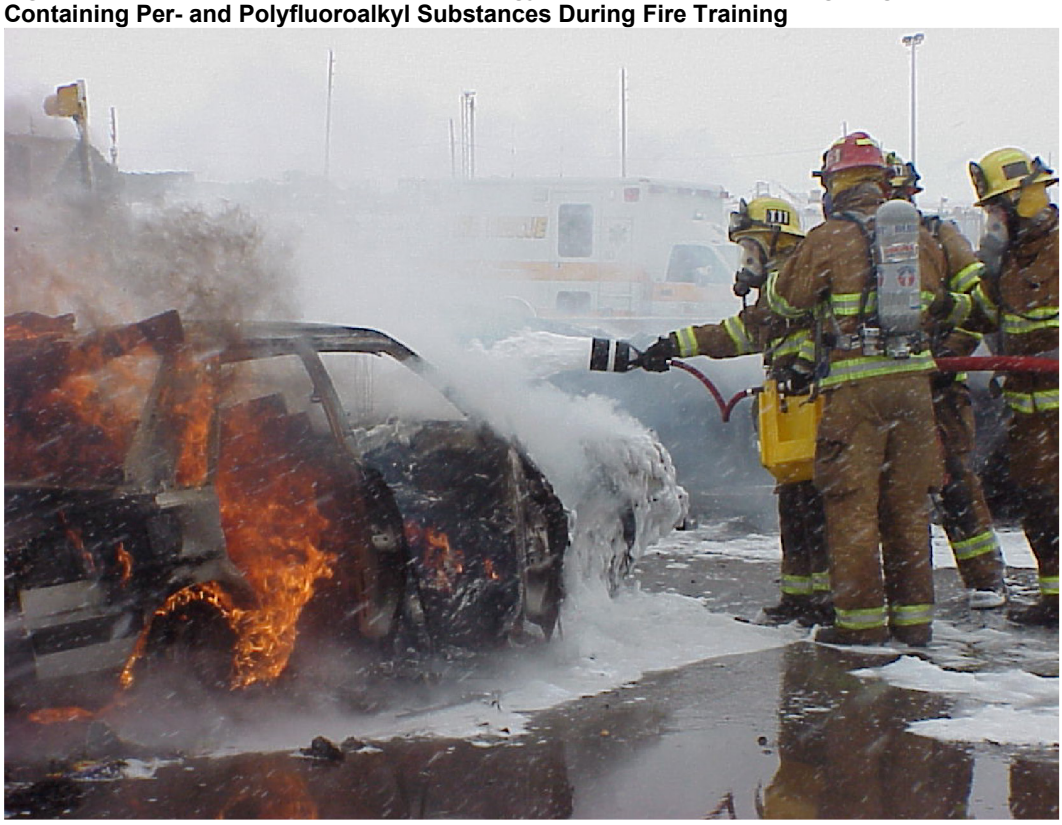
Q&A Report to Congressional Requesters

September 10, 2025

Why This Matters

Certain per- and polyfluoroalkyl substances (PFAS) have been associated with negative impacts to human health and the environment, including infertility and cancer. Department of Energy (DOE) sites across the country have used PFAS for a variety of purposes, including firefighting and uranium enrichment, potentially leading to releases into the environment (see fig. 1). DOE manages sites in over 40 states, including national laboratories, nuclear weapons production sites, and current and former Manhattan Project and Cold War-era cleanup sites.

Figure 1: Example of the Department of Energy's Historical Use of Firefighting Foam Containing Per- and Polyfluoroalkyl Substances During Fire Training



Source: Department of Energy. | GAO-25-107809

In 2024, the Environmental Protection Agency (EPA) established legally enforceable maximum contaminant levels (MCLs) for six PFAS in drinking water. In 2024, EPA also designated two PFAS—perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate, also known as perfluorooctanesulfonic acid (PFOS)—as hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA).

In May 2025, EPA leaders announced that they plan to rescind the MCLs for several types of PFAS but intend to keep the MCLs for PFOA and PFOS as 4.0 parts per trillion (ppt) each and extend the compliance deadline for those MCLs beyond 2029. While the regulatory situation is evolving, DOE sites with certain on-site drinking water systems are expected to need to comply with these MCLs in the coming years. DOE sites with releases of PFOA and PFOS must comply with CERCLA's current requirements.

We were asked to review DOE's cleanup of PFAS. This report examines the laws and regulations relevant to cleanup efforts, and DOE's cleanup plans; identification, disposal, testing, and cleanup of PFAS contamination; spending on PFAS-related efforts; and estimated future costs.

Key Takeaways

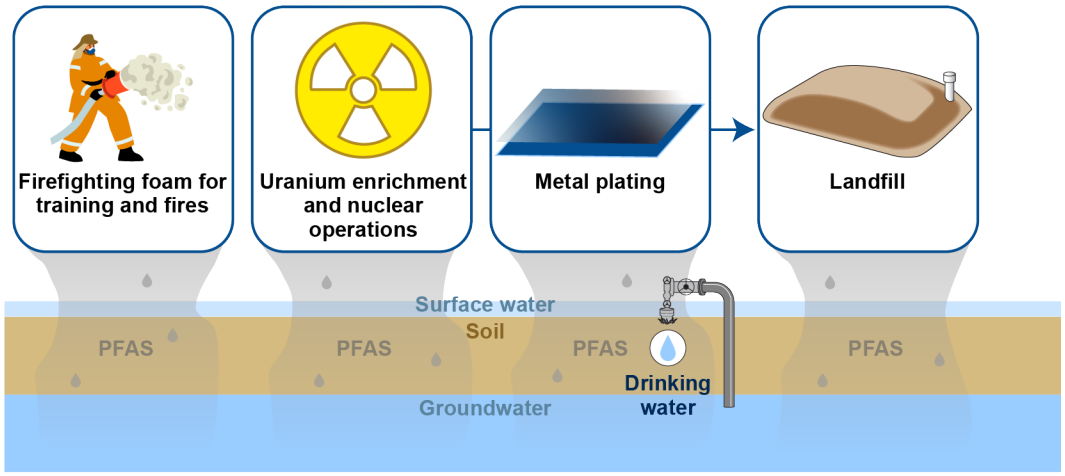
- DOE surveyed 57 of its sites' PFAS efforts, focusing on Manhattan Project and Cold War-era sites. According to the survey results and agency officials, 20 of these sites have completed an initial review to identify historical and current PFAS use, 21 sites have reviews in progress, and 16 have not started. Additionally, there are over 100 DOE sites that were not surveyed, and their actions to review historical PFAS use are unknown.
- Seventeen of the 57 surveyed DOE sites have on-site drinking water systems, and they have all tested these systems for certain PFAS. Three sites reported PFOA or PFOS in drinking water that exceeded federal MCLs of 4.0 ppt. These three sites treat or provide bottled water for use on site.
- DOE does not routinely include PFAS cleanup costs in its estimates of future cleanup costs such as environmental liabilities. According to agency officials, these costs are not yet sufficiently known to report under federal accounting standards. This means that future cleanup costs will be higher than currently reported liabilities.
- We recommend that DOE direct all its sites that have not completed an initial historical and current use review of PFAS to do so by an established deadline and report to the heads of each responsible DOE office on if additional investigation, characterization, or cleanup of PFAS contamination is needed.

Background

PFAS are a group of synthetic chemicals that have been linked to harmful health effects. For decades, PFAS have been used in a wide range of products, including waterproof clothing, nonstick cookware, and certain firefighting foams, such as aqueous film-forming foam (AFFF). PFAS, also known as "forever chemicals," are highly mobile in water, air, and soil; persistent in the environment; and resistant to degradation. PFAS can also bioaccumulate in humans, animals, and plants.

PFAS can enter the environment through numerous pathways. Releases of these chemicals from AFFF as well as other DOE activities—such as uranium enrichment—have resulted in PFAS contamination in and around numerous DOE sites. DOE sites may still use PFAS-containing materials for research or emergency fire suppression. The figure below highlights potential pathways of exposure from DOE activities.

Figure 2: Examples of Per- and Polyfluoroalkyl Substances (PFAS) Use and Potential Environmental Exposure at Department of Energy (DOE) Sites



Sources: GAO icons and analysis of Department of Energy documentation and interviews; ssstocker/stock.adobe.com (firefighter image). | GAO-25-107809

Note: Illustration depicts select examples of potential exposure pathways included in our analysis. This is not comprehensive of all PFAS exposure pathways from current and historical PFAS use at DOE sites. There are other current and historical operations at DOE involving PFAS that are not included here, such as in equipment maintenance. Further, the depicted activities do not necessarily always result in PFAS contamination of the surrounding environment when certain precautions or controls are in place.

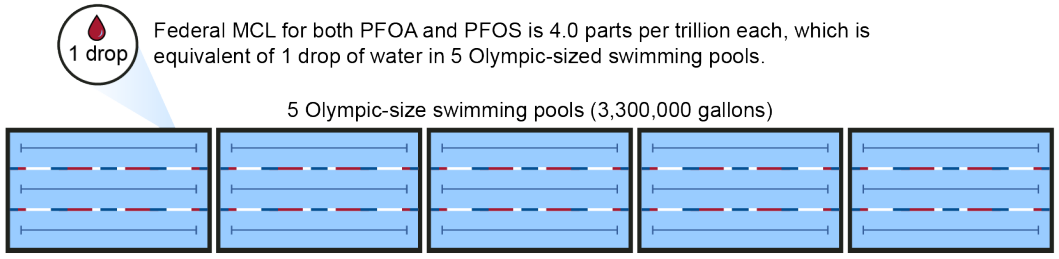
What federal laws and regulations are most relevant to DOE's PFAS cleanup efforts?

The most relevant federal laws and regulations for DOE's PFAS cleanup efforts are those that require federal agencies to clean up certain contamination at sites and facilities under agency jurisdiction. These include the following:

Safe Drinking Water Act

The Safe Drinking Water Act authorizes EPA to set legally enforceable standards that limit the level of specific contaminants in drinking water. Under that authority, in April 2024, EPA established MCLs for six PFAS in drinking water. For example, it set individual MCLs for PFOA and PFOS at 4.0 ppt each—which is the equivalent of 1 drop of water in 5 Olympic-sized swimming pools (see fig. 3).

Figure 3: Federal Maximum Contaminant Level (MCL) for Perfluorooctanoic Acid (PFOA) or Perfluorooctane Sulfonate (PFOS) in Drinking Water



Source: GAO icons and analysis. | GAO-25-107809

The PFAS MCLs apply to certain DOE public water systems, such as those at the Kesselring Site (New York) and Paducah Gaseous Diffusion Plant (Kentucky).[1] Under the current rule, such water systems must complete initial monitoring for the regulated PFAS by 2027 and take any necessary actions—such as implementing a treatment method—to comply with the MCLs by April 2029.

In May 2025, EPA announced that it plans to rescind several of the PFAS MCLs but intends to keep MCLs for PFOA and PFOS. EPA also announced that it plans to extend the compliance deadlines for these PFAS.[2]

CERCLA

CERCLA authorizes the President to respond to actual or threatened releases to the environment of (1) hazardous substances and (2) pollutants or contaminants that may pose an imminent and substantial danger to public health or the environment. Under CERCLA, federal agencies are responsible for cleaning up such releases from facilities under their jurisdiction, custody, or control. Examples of DOE sites where cleanup activities are being managed under CERCLA include Brookhaven National Laboratory (New York), Pantex Plant (Texas), and Paducah Gaseous Diffusion Plant (Kentucky).

In 2024, EPA designated PFOA and PFOS as hazardous substances under CERCLA, making releases of those PFAS subject to related release notification requirements and opening up CERCLA's response authorities for such releases.[3] When cleanup is needed because of the risks posed by a release, CERCLA does not set cleanup levels for specific substances like PFOA or PFOS. Instead, it generally requires that long-term cleanups comply with applicable or relevant and appropriate requirements. These may include federal and state standards—such as MCLs—that regulate exposure to contaminants.

Under CERCLA, EPA oversees cleanups at federal facilities on the National Priorities List, which includes some of the most seriously contaminated sites around the country (also known as Superfund sites). At its National Priorities List sites, DOE enters into an interagency agreement with EPA and, typically, the state regulator, often known as a federal facility agreement. These agreements govern the investigation and cleanup of releases at these facilities, including releases of relevant PFAS. At contaminated DOE sites not on the National Priorities List, depending on the site's regulatory status, cleanup activities may proceed under CERCLA, the Resource Conservation and Recovery Act of 1976, as amended (RCRA), or state law, and those activities are typically overseen by state agencies.

RCRA

RCRA authorizes EPA to regulate hazardous waste from generation to disposal. RCRA generally requires a permit for the treatment, storage, and disposal of hazardous waste. EPA may authorize a state to implement its own hazardous waste program in lieu of the federal program, and most states now implement RCRA's permit requirements. Many DOE sites have these permits. RCRA mandates that such permits require cleanup—or "corrective action"—for releases of hazardous waste or constituents from certain permitted facilities.

Currently, no PFAS are listed as hazardous waste under the federal RCRA program. However, EPA has proposed two PFAS-related rules under RCRA, one of which would list nine PFAS as hazardous constituents. If finalized, this rule would allow EPA and authorized states to pursue cleanup of releases of these PFAS from certain RCRA-permitted facilities. Examples of DOE sites with RCRA-regulated activities include Knolls Atomic Power Laboratory (New York), Rocky Flats Site (Colorado), and Los Alamos National Laboratory (New Mexico).

What state laws and regulations are most relevant to DOE's PFAS cleanup efforts?

Certain state laws and regulations may also impact DOE's PFAS cleanup efforts at sites across the country. For example, state PFAS-related standards—such as state MCLs—that are more stringent than federal standards and determined to be legally applicable or relevant and appropriate under the circumstances presented at a site may become cleanup standards at DOE's CERCLA sites. While there is currently no universal federal standard for safe PFAS levels in soil, officials from Brookhaven National Laboratory told us that New York State has established guidance values for soil cleanup for the protection of groundwater at 0.8 parts per billion for PFOA and 1 part per billion for PFOS.[4] If these values are incorporated into state regulations, they could become cleanup standards that apply to DOE sites in the state in the future.

Additionally, certain states are moving to regulate PFAS under their own hazardous waste programs while awaiting federal action. Under RCRA, states may adopt the federal RCRA regulations verbatim or adopt state regulations that are equivalent to or more stringent than the federal regulations. For example, New Mexico recently enacted a law that makes discarded firefighting foam containing intentionally added PFAS a hazardous waste under state law. Even though such firefighting foam is not currently deemed a hazardous waste under federal RCRA regulations, the Federal Facility Compliance Act of 1992 makes clear that federal agencies—including DOE—are subject to such state and local requirements concerning the control of hazardous waste.

How has DOE planned to address PFAS contamination?

DOE has planned to address PFAS contamination primarily by issuing policy memos, developing a strategic roadmap, and surveying DOE sites to understand the status of PFAS efforts.

Policy memos

DOE-wide plans to address PFAS contamination began in 2021 with a policy memo from the Deputy Secretary of Energy.[5] This memo

- banned the use of PFAS-containing AFFF except in emergencies or mission critical situations and suspended disposal of PFAS without special approval;
- outlined efforts program offices should take to appropriately characterize historical and current PFAS use and releases at DOE sites;
- established a DOE PFAS Coordinating Committee to track progress in meeting the requirements of the memo and clarify additional resources needed to support identification, testing, and cleanup of PFAS, among other things.

More recently, in December 2024, the Deputy Secretary of Energy issued a new policy memo pertaining to PFAS that lifted the DOE PFAS disposal moratorium and revised the PFAS Coordinating Committee's role to encompass all emerging contaminants.[6]

Roadmap

In August 2022, DOE published its *PFAS Strategic Roadmap: DOE Commitments to Action 2022-2025*, which outlines plans for historical and current PFAS use reviews, reports, research, and coordination. DOE has been implementing its 2022-2025 Roadmap and has promoted or developed guidance and planning documents to support the agency's PFAS efforts. These include the *Guide for Investigating Historical and Current Uses of PFAS at DOE Sites,* the *PFAS Environmental Sampling Guidance,* and the *Initial DOE PFAS Research*

Plan. DOE has also completed several other reports planned for in the Roadmap that are awaiting signature at the department level without a planned publication date, according to DOE officials.

DOE officials from the Office of Environment, Health, Safety, and Security said in April 2025 that they plan to complete the commitments in the Roadmap. However, they added that they are waiting to see what the new Administration and new Secretary's priorities are before conducting any additional planning for PFAS efforts beyond when the Roadmap ends later this year.

Surveys of DOE sites

As called for in the Roadmap, DOE surveyed 57 sites (surveyed sites) about PFAS efforts, focusing on Manhattan Project and Cold War-era sites, and wrote two reports describing those sites' efforts to date.[7] DOE's reports did not include information on more than 100 sites. For example, DOE's Power Marketing Administrations, which own a variety of electrical substations, transformers, and other facilities across the continental United States, were not included in the reports.

To what extent has DOE identified historical and current PFAS use at its sites?

Twenty of the 57 surveyed sites have completed the initial review of historical and current PFAS use, 21 are in progress, and 16 have not started, according to the 2024 DOE PFAS survey and officials. DOE sites varied in activities to identify use of PFAS, but they generally reviewed site records and interviewed past and current site employees following the *Guide for Investigating Historical and Current Uses of PFAS at DOE Sites*.

Several factors complicate DOE's review of its historical and current use of PFAS. For example, although PFAS have been in use since the 1940s, until recently they were not considered a risk to the environment or human health. Accordingly, the nature and extent of PFAS use and contamination may not have been documented. Another complicating factor is that some historic uses of PFAS at DOE—such as in uranium enrichment—may be classified or inaccessible due to the age of the operational activities. Further, PFAS, as "forever chemicals," may have had years to migrate without detection or characterization, making the origins difficult to find, according to DOE documents.

The most commonly identified use of PFAS across DOE sites was AFFF used in fire training and firefighting activities. For example, a historical review at Brookhaven National Laboratory found photographic evidence of AFFF use and spills during testing and training, resulting in a large amount of it being released into the environment (see fig. 4).

Figure 4: Workers Testing an Aqueous Film-Forming Foam Fire Suppression System at Brookhaven National Laboratory in 1970

Source: Department of Energy. | GAO-25-107809

According to DOE, EPA, and state officials we interviewed, a single release of AFFF can result in lasting PFAS contamination in soil or levels in groundwater that exceed federal PFAS MCLs for drinking water. Drinking water standards are not directly applicable to soil or groundwater; however, we have previously reported that DOE sites are often required to clean up contaminated groundwater to drinking water standards.[8] Interviews with fire department managers during the Pantex Plant's historical review revealed that approximately 1,000 gallons of AFFF were released at the site during routine training exercises twice a year for decades. In addition, approximately one quart of AFFF was discharged to the ground from each firetruck daily (total of a gallon per day) to clear nozzles and maintain readiness.

The Deputy Secretary's 2021 policy memo directs program offices to appropriately characterize historic PFAS use and releases at DOE sites but does not include a deadline for conducting such work. The 2021 memo also emphasizes that the policy applies to all elements of the Department of Energy. The 2024 memo upholds these requirements and emphasizes that the department should continue to characterize PFAS at sites and identify historical and ongoing PFAS use.

While 20 of the 57 DOE surveyed sites have completed the initial review of their historical and current PFAS use and reported their efforts, 37 surveyed sites have not done so. Additionally, there are over 100 sites not covered in the surveys, and their actions to review PFAS use are unknown.[9] DOE officials said that they plan to expand their efforts to include other sites going forward but, as of April 2025, have no documented plans or time frames for doing so.

If sites do not review their historical and current use of PFAS in a timely manner, DOE will not know which sites may be impacted by PFAS contamination, and therefore the sites where DOE should test to ensure it does not pose a risk to human health and the environment. Further, without such information, DOE will

be limited in its ability to prioritize where PFAS cleanup is most needed or estimate cleanup costs.

How has DOE managed its inventory and disposal of PFAS-containing substances?

Sites may be storing AFFF or other PFAS-containing substances in their inventory for future use or until the substances can be shipped off-site for disposal. Specifically, 39 of the 57 surveyed sites identified PFAS-containing substances in their inventory, either in use or awaiting disposal.

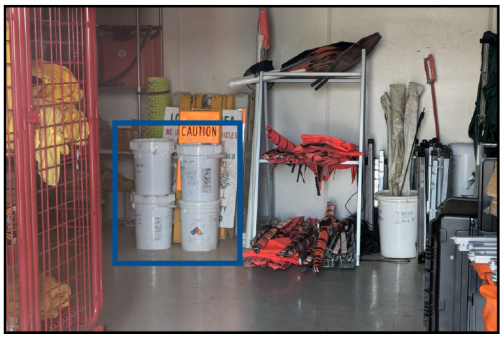
We selected nine sites with known PFAS contamination for additional analysis, and seven of those sites have disposed of PFAS or are storing PFAS-containing materials in their inventory and will dispose of it in the future.[10] For example, as of May 2025, the Paducah Gaseous Diffusion Plant was storing a 120-gallon tank of AFFF until it could be shipped off-site for disposal, according to officials (see fig. 5 for examples of PFAS-containing materials in storage or waiting for disposal). Additionally, Knolls Atomic Power Laboratory shipped about 100 gallons of used oil from maintenance facilities that tested positive for PFAS to a disposal facility in Michigan in accordance with the facility's waste acceptance criteria, according to officials.

Figure 5: Photos of Firefighting Foam Containing Per- and Polyfluoroalkyl Substances (PFAS) in Storage or Waiting for Disposal at Department of Energy Sites

Aqueous film-forming foam (AFFF) fire extinguishers at the **Kesselring Site (NY)** in storage and awaiting disposal.

Roll-off containers holding a solidified mixture of AFFF and cement awaiting disposal at the **Savannah River Site (SC).**

Tank with AFFF awaiting disposal at **Paducah Gaseous Diffusion Plant (KY).**



Buckets of AFFF at **Oak Ridge National Laboratory (TN)** stored for future use or disposal (inside blue square).

Sources: Department of Energy (top left and bottom left); Travis Shaw/Savannah River Nuclear Solutions (top right); and GAO (bottom right). | GAO-25-107809

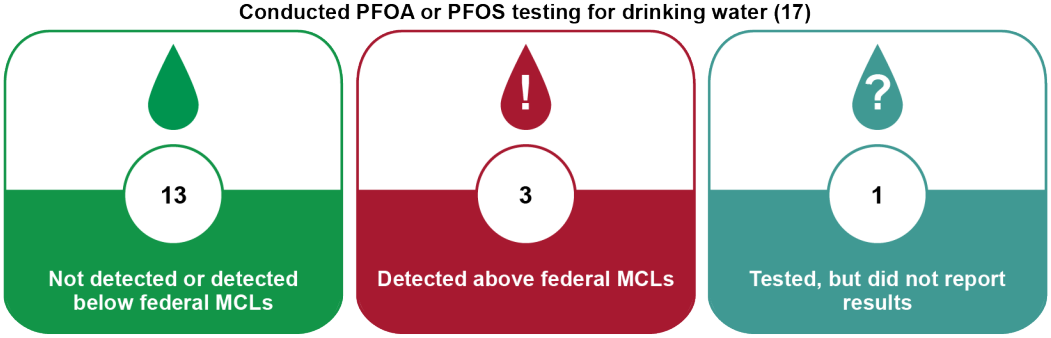
To what extent has DOE tested for PFAS contamination?

As of 2024, all DOE sites with on-site drinking water supplies had tested drinking water for PFAS but most of the 57 surveyed sites had not tested groundwater for PFAS.

Seventeen of the 57 surveyed sites have on-site drinking water supplies and all 17 have tested their drinking water for certain PFAS contamination. Three of these 17 sites have reported levels for PFOA or PFOS that exceed federal MCLs

for these PFAS in drinking water (see fig. 6), though these levels do not go into effect until April 2029 and the current administration has indicated it is likely to extend this date.

Figure 6: Department of Energy (DOE) Sites with On-site Drinking Water Supplies That Have Tested for Perfluorooctanoic Acid (PFOA) or Perfluorooctane Sulfonate (PFOS) in Drinking Water, as of 2024



Source: GAO icons and analysis of Department of Energy documentation. | GAO-25-107809

Note: This figure reports on a subset of sites for which DOE assessed PFAS efforts from 2021 through 2024. As of April 2024, the federal maximum contaminant levels (MCLs) for PFOA and PFOS were 4.0 parts per trillion each for drinking water, although these levels do not go into effect until April 2029 and the current administration has indicated it is likely to extend this date.

DOE has taken action at the three sites where PFOA or PFOS levels were found in on-site drinking water systems above 4.0 ppt. Brookhaven National Laboratory now treats its drinking water supply for PFAS. Both the Paducah Gaseous Diffusion Plant and the Portsmouth Gaseous Diffusion Plant have been providing alternative drinking water to employees by supplying bottled water since 2015 and 2012, respectively, as a best management practice, according to officials (see fig. 7).

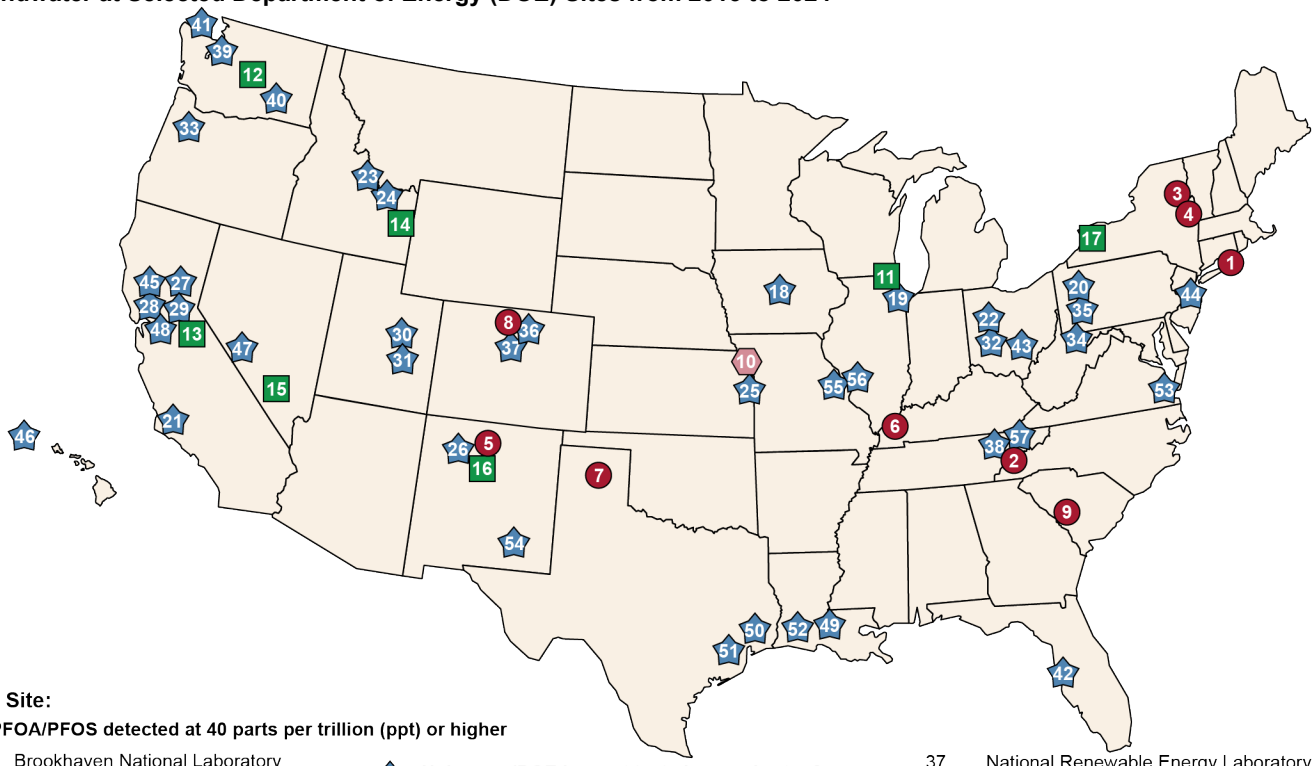
Figure 7: Bottled Drinking Water for Workers at the Paducah Gaseous Diffusion Plant

Source: Department of Energy. | GAO-25-107809

Figure 8 summarizes the status of PFAS testing in groundwater across the 57 surveyed DOE sites. Seventeen surveyed sites sampled for certain PFAS in groundwater. Ten of those sites reported PFOA or PFOS contamination in

groundwater in excess of 4.0 ppt—which is the federal MCL for these PFAS in drinking water. The other seven sites did not detect PFAS or detected PFOA or PFOS below 4.0 ppt in the groundwater tests that were conducted.[11] As we have previously reported, when remediation of contaminated groundwater is needed, DOE sites are often required to clean up groundwater to drinking water standards.[12] The highest level of PFAS detected in groundwater was a PFOS detection of 128,000 ppt at Paducah Gaseous Diffusion Plant.

Figure 8: Maximum Reported Levels of Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) Detected in Groundwater at Selected Department of Energy (DOE) Sites from 2015 to 2024



DOE Site:

PFOA/PFOS detected at 40 parts per trillion (ppt) or higher

1 Brookhaven National Laboratory
2 East Tennessee Technology Park
3 Kesselring Site
4 Knolls Atomic Power Laboratory
5 Los Alamos National Laboratory
6 Paducah Gaseous Diffusion Plant
7 Pantex Plant
8 Rocky Flats Site
9 Savannah River Site

PFOA/PFOS detected between 4 and 40 ppt

10 Kansas City Plant

PFOA/PFOS not detected, or detected below 4 ppt

11 Fermi National Accelerator Laboratory
12 Hanford Site
13 Lawrence Livermore National Laboratory - Site 300
14 Naval Reactors Facility
15 Nevada National Security Site
16 Sandia National Laboratory - New Mexico
17 West Valley Demonstration Project

Unknown (DOE has not tested groundwater for PFOA/PFOS)

18 Ames National Laboratory
19 Argonne National Laboratory
20 Bettis Atomic Power Laboratory
21 Energy Technology Engineering Center
22 Fernald Preserve
23 Idaho Cleanup Project
24 Idaho National Laboratory
25 Kansas City National Security Campus
26 Kansas City National Security Campus - New Mexico
27 Laboratory for Energy-Related Health Research
28 Lawrence Berkeley National Laboratory
29 Lawrence Livermore National Laboratory - Main Site
30 Moab Site
31 Monticello Disposal and Processing Sites
32 Mound Site
33 National Energy Technology Laboratory - Albany
34 National Energy Technology Laboratory - Morgantown
35 National Energy Technology Laboratory - Pittsburgh
36 National Renewable Energy Laboratory - Flatirons Campus
37 National Renewable Energy Laboratory - South Table Mountain Campus
38 Oak Ridge National Laboratory
39 Pacific Northwest National Laboratory - Airport
40 Pacific Northwest National Laboratory - Richland
41 Pacific Northwest National Laboratory - Sequim
42 Pinellas County Site
43 Portsmouth Gaseous Diffusion Plant
44 Princeton Plasma Physics Laboratory
45 Sandia National Laboratory - California
46 Sandia National Laboratory - Kauai Test Facility
47 Sandia National Laboratory - Tonopah Test Range
48 Stanford Linear Accelerator Center
49 Strategic Petroleum Reserve - Bayou Choctaw
50 Strategic Petroleum Reserve - Big Hill
51 Strategic Petroleum Reserve - Bryan Mound
52 Strategic Petroleum Reserve - West Hackberry
53 Thomas Jefferson National Accelerator Facility
54 Waste Isolation Pilot Plant
55 Weldon Spring - Chemical Plant
56 Weldon Spring - Quarry
57 Y-12 National Security Complex

Sources: GAO analysis of Department of Energy documentation; Map Resources (map). | GAO-25-107809

Note: This figure represents sites as discrete locations, or for co-located sites, those with discrete water systems and different office management. This is not comprehensive of all DOE sites. For example, the DOE Power Marketing Administrations and most Office of Legacy Management sites are not included in the figure and have not been tested for per- and polyfluoroalkyl substances (PFAS), according to officials. GAO categorized a site's sampling as groundwater testing based on the EPA sampling method used and the stated purpose of the sampling. Additionally, a test result where PFOA or PFOS was not detected does not mean that the site is free of PFAS contamination, as the extent of testing may be limited to certain locations and types of PFAS. The federal maximum contaminant levels (MCLs) for PFOA and PFOS in drinking water are 4.0 ppt each, although those standards will not be in effect until April 2029, and the current administration has indicated it is likely to extend this date. While these MCLs are not directly applicable to groundwater, DOE has used drinking water MCLs for groundwater cleanup targets for other environmental cleanup efforts.

There is wide variation in the extent of PFAS testing. For example, Brookhaven National Laboratory has tested for PFAS at hundreds of on-site and off-site locations. In contrast, Hanford Site has conducted tests in three locations on the 580 square mile site. These tests at Hanford did not detect PFAS. A test result where PFAS was not detected does not mean that the site is free of PFAS contamination, as the extent of testing may be limited to certain locations.

DOE sites that have completed an initial review of historical and current PFAS use and did not identify PFAS use at the site have generally not been required or encouraged to complete testing by DOE. However, testing may also be driven by requests and requirements from federal or state regulators. For example, the Colorado Department of Public Health and Environment requested PFAS testing at the Rocky Flats Site in response to PFOA and PFOS being added to Colorado's hazardous constituents list, according to DOE and state officials.

To what extent has DOE cleaned up PFAS contamination?

DOE is early in the process of cleaning up PFAS. Two of the nine sites we selected for additional analysis have started efforts to clean up PFAS in groundwater. Each site's cleanup plan is informed by factors such as findings during testing and the applicable federal and state regulations, according to officials. For example, since October 2022, Brookhaven National Laboratory has treated over 700 million gallons of water for PFAS through groundwater treatment systems using granular activated carbon. While the site is actively cleaning its groundwater, water seeping through contaminated soil continues to release more PFAS into the groundwater. Because there are limited options for soil remediation, agency officials said full remediation (including soil and water cleanup) is still many years away. In one area of the site, contaminated soil has been excavated and stored, awaiting treatment or disposal (see fig. 9).

Figure 9: Soil Contaminated with Per- and Polyfluoroalkyl Substances Excavated During a Construction Project at Brookhaven National Laboratory Awaiting Treatment or Disposal

Source: GAO. | GAO-25-107809

Similarly, the Pantex Plant has been treating groundwater for PFAS using granular activated carbon pump and treat systems in multiple locations on the site. The systems were originally built to treat high explosives contamination, but officials found that the systems successfully capture PFAS as well. Officials have increased the frequency with which they change the carbon filters to ensure the maximum amount of PFAS and high explosives are removed from the perched groundwater. The carbon is then disposed of in hazardous waste landfills.

What do DOE data show about spending on selected PFAS-related efforts through 2024?

At the nine sites we selected for additional analysis, DOE reported spending about $20 million from the start of PFAS-related efforts through 2024 on PFAS identification, testing, and cleanup. Sites typically conducted this work as part of other monitoring or cleanup efforts. Eight of the nine selected sites reported their estimated spending on PFAS-related efforts, while one site, East Tennessee Technology Park, conducted efforts to monitor for certain PFAS but could not report those costs separately from other monitoring efforts. All nine selected sites used funding from existing budget lines or programs—such as those that fund environmental remediation or long-term stewardship—to address PFAS at those sites. In addition, Brookhaven National Laboratory received discrete funds to directly address PFAS ($10.9 million in fiscal year 2020) for accelerated PFAS source area groundwater characterization and remediation, according to the site's budget documentation. See table 1 for information on DOE PFAS spending.

Table 1: Selected DOE Sites' Estimated Spending for Per- and Polyfluoroalkyl Substances (PFAS) Identification, Testing, and Cleanup Efforts through 2024 and Budget Line Funds Used

DOE Office and Site	PFAS-Related Expenditures through 2024	Budget Line Funds Used
Office of Environmental Management		
East Tennessee Technology Park (TN)	Unknown, non-zero amount	-
Paducah Gaseous Diffusion Plant (KY)	$862,000	Uranium Enrichment Decontamination and Decommissioning
Office of Legacy Management		
Rocky Flats Site (CO)	$1,000,000	Long-Term Surveillance and Maintenance
National Nuclear Security Administration		
Pantex Plant (TX)	$518,000	Long-Term Stewardship
Y-12 National Security Complex (TN)	$30,000	Environmental Compliance
Naval Reactors		
Kesselring Site (NY)	$304,000	Radiological/Environmental Remediation and Demolition
Knolls Atomic Power Laboratory (NY)	$129,000	Radiological/Environmental Remediation and Demolition
Office of Science		
Brookhaven National Laboratory (NY)	$17,000,000	Overhead; General Plant Projects; Consolidated Unfunded Requirements Line; Central Utilities Revitalization Project
Oak Ridge National Laboratory (TN)	$100,000	Environmental Compliance
Total Selected Sites	**Approximately $20 million**	

Source: GAO analysis of Department of Energy (DOE) information and documentation. | GAO-25-107809
Note: Some sites' PFAS efforts started in 2017 or 2018, while other sites did not have PFAS expenditures until 2022. These amounts are the sites' estimated spending through 2024, rounded to the nearest thousand. These values have not been adjusted for inflation.

Agency officials indicated that a good portion of these costs was related to sampling for PFAS contamination because seven out of nine selected sites have not yet started cleanup efforts. According to agency officials, testing a single sample could cost anywhere from $230 for drinking water to $700 for soil. Officials from the Pantex Plant estimated their PFAS sampling costs through 2024 to be around $250,000 or about 50 percent of their PFAS-related costs incurred during this time frame. Officials from the Kesselring Site estimated their

PFAS sampling costs at around $230,000 for this time frame or 75 percent of total PFAS-related costs for the site.

In contrast, Brookhaven National Laboratory is actively treating groundwater and drinking water for PFAS, which is relatively more expensive than sampling. PFAS sampling costs accounted for approximately 5 percent of Brookhaven's total estimated PFAS-related costs, $900,000 of $17 million through 2024, but the site has continued sampling into 2025. As of May 2025, Brookhaven officials estimate sampling to date at approximately 5,000 analyses of groundwater and soils collected from almost 800 on-site and off-site locations.

To what extent has DOE assessed its future PFAS cleanup costs?

Three of the nine DOE sites we selected for additional analysis have predicted some future costs to address PFAS. However, six selected sites are too early in the cleanup process to have the ability to estimate future costs or environmental liabilities, according to officials.[13] Estimated PFAS cleanup costs are not generally included in DOE's environmental liabilities as of April 2025.

Selected sites future cost estimates

As of 2025, three of the nine selected sites estimated future costs to address PFAS totaling at least $74.5 million, but that estimate did not include any cleanup actions for one of those three sites (see table 2). The six remaining selected sites have not yet estimated such costs.

Table 2: Estimated Future Costs, 2025 and Beyond, to Address Per- and Polyfluoroalkyl Substances (PFAS) Contamination for Selected DOE Sites

DOE Office and Site	Estimated PFAS Future Costs	Future Costs Include Testing or Feasibility Studies (Y/N)	Future Costs Include Cleanup Actions (Y/N)
Office of Environmental Management			
East Tennessee Technology Park (TN)	Unknown	N	N
Paducah Gaseous Diffusion Plant (KY)	Unknown	N	N
Office of Legacy Management			
Rocky Flats Site (CO)	$6,000,000 +	Y	N
National Nuclear Security Administration			
Pantex Plant (TX)	$33,500,000	Y	Y
Y-12 National Security Complex (TN)	Unknown	N	N
Naval Reactors			
Kesselring Site (NY)	Unknown	N	N
Knolls Atomic Power Laboratory (NY)	Unknown	N	N
Office of Science			
Brookhaven National Laboratory (NY)	$35,000,000+	Y	Y
Oak Ridge National Laboratory (TN)	Unknown	N	N
Total Selected Sites	**At Least $74.5 million**	**3**	**2**

Source: GAO analysis of Department of Energy (DOE) information and documentation. | GAO-25-107809
Note: These values have not been adjusted for inflation; they are the nominal values.

Sites do not currently have appropriated funds for these estimated future costs, according to DOE officials. For example, Brookhaven National Laboratory has developed plans for a study under CERCLA to characterize site conditions, assess risks to human health and the environment, and evaluate alternative remedial actions related to PFAS contamination. However, preliminary estimates suggest the site would need approximately $10 million in additional funding to implement the study, according to DOE officials.

Brookhaven currently uses approximately $4 million of overhead funds annually for its long-term stewardship activities, which extend beyond PFAS, according to

DOE officials. Brookhaven has maximized the impact of its PFAS funding by modifying existing treatment systems, thermally treating and reusing granular activated carbon, and refurbishing and repairing already existing facilities. Such facilities include the treatment building pictured below (see fig. 10), which has removed 1.2 lbs.—a substantial amount—of PFAS from groundwater as of February 2025, according to DOE officials. However, officials still anticipate years of PFAS cleanup work and said that funding needs will more than double the amount already spent to clean up legacy PFAS contamination.

Figure 10: Brookhaven National Laboratory Building Originally Slated for Demolition Was Repurposed to Treat Per- and Polyfluoroalkyl Substances in Groundwater with Granular Activated Carbon Filters

Source: GAO. | GAO-25-107809

Other selected sites have not yet estimated their future costs for PFAS investigation and cleanup because these sites are still working to identify the extent of contamination and cleanup needs. For example, the Oak Ridge Reservation (encompassing East Tennessee Technology Park, Y-12 National Security Complex, and Oak Ridge National Laboratory) has found levels of certain PFAS in surface water that exceed federal MCLs for drinking water, but officials told us that this water is not used for drinking. Oak Ridge Reservation officials said they plan to conduct a background study in the coming years to determine if contamination levels at these DOE sites are comparable to the general Oak Ridge area outside of the DOE sites. Officials had no plans for developing future costs estimates without collecting this information first.

Selected sites' environmental liabilities

Three of the nine selected sites (Rocky Flats, Pantex Plant, and Brookhaven) have included some PFAS-related costs in the sites' environmental liabilities estimates. Officials from Rocky Flats and Pantex Plant included their sites' estimated PFAS future costs of $6 million and $33.5 million, respectively, in their sites' environmental liabilities. However, those estimates do not include all

potential PFAS environmental liabilities. For example, officials from Pantex Plant said that PFAS-related environmental liabilities estimates were a partial estimate of the total potential costs, especially if further investigation finds PFAS in the Ogallala Aquifer—which supplies drinking water to Amarillo and the surrounding agricultural community. Brookhaven officials estimated the site's emerging contaminants environmental liability at between $80 to 90 million, but that estimate is based on numerous assumptions, and it includes both PFAS and another contaminant called 1,4-dioxane. Moreover, it only covers planned activities, not potential future cleanup needs.

DOE's PFAS environmental liabilities

DOE's 2024 Agency Financial Report listed PFAS as a key safety challenge and management priority. However, cleanup costs for PFAS contamination are generally not included in DOE's environmental liabilities, which were totaled at $545 billion. DOE officials noted that addressing PFAS contamination is a looming liability but that more information is needed before PFAS cleanup costs can be reported as environmental liabilities. Specifically, officials said that further investigations to define the extent of contamination and required cleanup are needed to support estimates that would be considered reasonable under the federal accounting standards.

Conclusions

DOE policy memos direct all sites to characterize PFAS use but do not have a clear deadline for conducting such work, and plans supporting the policy memos end in 2025. To date, 20 DOE sites have completed historical and current use reviews for PFAS.

Due to the persistent nature of PFAS chemicals, DOE may face significant costs in addressing them well into the future. If sites do not review their historical and current use of PFAS, DOE will not know the extent to which more than 100 of its sites may be affected by PFAS contamination and, therefore, the sites where PFAS from DOE activities may pose a risk to human health and the environment. Until DOE has this information, it will have limited ability to effectively test for contamination, prioritize where cleanup actions may be most needed, or reliably estimate future cleanup costs.

Recommendation for Executive Action

The Secretary of Energy should direct all DOE sites that have not completed an initial historical and current use review of PFAS to do so by an established deadline and report to the heads of each responsible DOE office on if additional investigation, characterization, or cleanup of PFAS contamination is needed. (Recommendation 1)

Agency Comments

We provided a draft of this report to DOE for review and comment. In its comments, reproduced in appendix I, DOE concurred with our recommendation and stated that DOE is evaluating how to address it. DOE also provided technical comments which we incorporated, as appropriate.

How GAO Did This Study

We assessed relevant laws, regulations, and agency documentation related to DOE's cleanup of PFAS. For example, we reviewed DOE policy memos, guidance, reports, and plans on PFAS. We interviewed and analyzed documentation from officials from six different DOE offices that are involved in the PFAS Coordinating Committee.

We also interviewed officials and reviewed documentation from a non-generalizable sample of nine DOE sites. Findings from our non-generalizable

sample cannot be used to make inferences about all DOE sites, but the selected sites are illustrative of DOE sites with PFAS contamination. The nine selected sites were (1) Brookhaven National Laboratory in New York, (2) East Tennessee Technology Park in Tennessee, (3) Knolls Atomic Power Laboratory in New York, (4) Kesselring Site in New York, (5) Oak Ridge National Laboratory in Tennessee, (6) Paducah Gaseous Diffusion Plant in Kentucky, (7) Pantex Plant in Texas, (8) Rocky Flats Site in Colorado, and (9) Y-12 National Security Complex in Tennessee. We selected these sites based on these factors:

- PFAS usage and test results
- Range of DOE offices and geographic regions
- State or EPA regulators requiring or encouraging site action on PFAS
- GAO resource constraints

We visited Brookhaven National Laboratory, Knolls Atomic Power Laboratory, Kesselring Site, the Oak Ridge Reservation, and Paducah Gaseous Diffusion Plant to better understand the PFAS contamination, identification, testing, and cleanup efforts at those locations. In addition, we interviewed officials from EPA and the states that regulate these nine selected sites to help us understand the regulatory framework affecting DOE's PFAS cleanup.

We conducted this performance audit from September 2024 through September 2025 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

List of Requesters

The Honorable Frank Pallone, Jr.
Ranking Member
Committee on Energy and Commerce
House of Representatives

The Honorable Kathy Castor
Ranking Member
Subcommittee on Energy
Committee on Energy and Commerce
House of Representatives

The Honorable Paul D. Tonko
Ranking Member
Subcommittee on Environment
Committee on Energy and Commerce
House of Representatives

The Honorable Diana DeGette
Ranking Member
Subcommittee on Health
Committee on Energy and Commerce
House of Representatives

As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution until 14 days from the report date. At that time, we will send copies of this report to the Secretary of Energy and other

interested parties. In addition, the report is available at no charge on the GAO website at https://www.gao.gov.

GAO Contact Information

For more information contact: Nathan Anderson, Director, Natural Resources and Environment, AndersonN@gao.gov.

Sarah Kaczmarek, Managing Director, Public Affairs, Media@gao.gov.

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Staff Acknowledgments: Janice Poling (Assistant Director), Natalie Block (Analyst-in-Charge), and Grace Haskin made key contributions to this report. Also contributing to the report were Justine Augeri, Courtney Bond, Sarah Craig, Elizabeth Dretsch, Claudia Hadjigeorgiou, Edward Rice, Caitlin Scoville, Christopher Spain, and Sara Sullivan.

Appendix I: Comments from the Department of Energy

Department of Energy
Washington, DC 20585

August 15, 2025

Mr. Nathan Anderson
Director
Natural Resources and Environment
U.S. Government Accountability Office
441 G Street N.W.
Washington, DC 20548

Dear Mr. Anderson:

Thank you for the opportunity to review the Government Accountability Office Draft Report, "PERSISTENT CHEMICALS: "DOE Should Complete Efforts to Review PFAS Use (GAO-25-107809)."

The GAO report recommends that the Secretary of Energy direct a more complete effort to review past PFAS use at DOE sites according to a defined deadline. DOE is still evaluating the best way to address this recommendation and collect additional information regarding past PFAS use. DOE will provide a more specific action plan to address this recommendation when it provides the Congressional Letter required by 31 U.S.C. 720.

If you have any questions please contact Dr. Josh Silverman, Director, Office of Environmental Protection and ES&H Reporting at 202-586-6535 or josh.silverman@hq.doe.gov.

Sincerely,

STEPHANIE MARTIN
Digitally signed by STEPHANIE MARTIN
Date: 2025.08.14 16:35:19 -04'00'

Stephanie Martin
Acting Director
Office of Environment, Health, Safety and Security

Attachment

Endnotes

[1]There are over 148,000 public water systems in the U.S. that provide drinking water to 90 percent of Americans. EPA regulations define a "public water system" as "a system for the provision to the public of water for human consumption through pipes or . . . other constructed conveyances, if such system has at least [15] service connections or regularly serves an average of at least [25] individuals daily at least 60 days out of the year." 40 C.F.R. § 142.2. The PFAS MCLs apply to (1) community water systems that supply water to the same population year-round, and (2) nontransient noncommunity water systems that regularly supply water to at least 25 of the same people at least 6 months per year, such as schools, office buildings, and hospitals.

[2]As of September 1, 2025, EPA has not taken additional public actions related to the PFAS MCLs aside from making the original May 2025 announcements.

[3]Until April 2024, no PFAS were designated as hazardous substances under CERCLA. However, CERCLA authorizes federal agencies, including DOE, to take cleanup actions not only for designated hazardous substances, but also for pollutants or contaminants which may present imminent and substantial danger to the public health or welfare in accordance with CERCLA regulations. Some agencies were addressing PFAS under this authority prior to the designation of PFOA and PFOS as hazardous substances under CERCLA.

[4]While there is no universal federal standard for PFAS levels in soil, EPA has developed regional screening levels for a range of PFAS in soil for CERCLA cleanup sites. These screening levels are risk-based values that are used to identify contaminated media (e.g., tap water and soil) at cleanup sites that may need further investigation. EPA calculates these values based on standard exposure assumptions and toxicity data. Regional screening levels are not final cleanup standards. Instead, they are risk-based values that help agencies determine whether to proceed in the CERCLA investigation process at a site. Other DOE sites in New York include Knolls Atomic Power Laboratory, Kesselring Site, and West Valley Demonstration Project.

[5]DOE, *Addressing Per- and Polyfluoroalkyl Substances at the Department of Energy,* Memorandum for Heads of Departmental Elements (Washington, D.C.: Sept. 16, 2021).

[6]DOE, *Managing Emerging Environmental Issues at the Department of Energy,* Memorandum for Heads of Departmental Elements (Washington, D.C.: Dec. 18, 2024).

[7]For this report, a DOE site is a discrete location that DOE owns. Some DOE sites are co-located but counted separately if there are discrete drinking water systems, such as in Idaho, or discrete site borders managed by different DOE offices, such as the three sites in Oak Ridge, Tennessee. The initial report was published in 2022. The updated report included information from 2023 and 2024 but has not been published as of September 1, 2025.

[8]GAO, *Nuclear Waste Cleanup: DOE Should Use Available Information to Measure the Effectiveness of Its Groundwater Efforts,* GAO-25-106938 (Washington, D.C.: Nov. 19, 2024).

[9]Not all of DOE's sites were included in the reports. For example, DOE's Office of Legacy Management, which manages 103 sites, responded to the survey for only eight of its sites, which are the sites that are being addressed under CERCLA or RCRA. Agency officials at the Office of Legacy Management told us they are working on conducting historical records searches for the other sites, but that effort is still in progress.

[10]We interviewed officials and reviewed documentation from a non-generalizable sample of nine DOE sites that had known PFAS contamination and were from a range of DOE offices and locations. The nine selected sites were (1) Brookhaven National Laboratory, (2) East Tennessee Technology Park, (3) Knolls Atomic Power Laboratory, (4) Kesselring Site, (5) Oak Ridge National Laboratory, (6) Paducah Gaseous Diffusion Plant, (7) Pantex Plant, (8) Rocky Flats Site, and (9) Y-12 National Security Complex.

[11]According to DOE documentation, sites use EPA's approved methods for testing around 40 types of PFAS in groundwater and other environmental media.

[12]GAO-25-106938.

[13]Federal accounting standards define a liability as a probable future outflow or other sacrifice of resources as a result of past transactions or events. Federal agencies are required by federal accounting standards to estimate future cleanup and waste disposal costs and to report such costs as environmental liabilities in their annual financial statements. Costs for cleanup work must be included in environmental liabilities estimates when they are both probable—i.e., more likely than not—and reasonably estimable—i.e., the outflow of resources that will be required is reliably quantifiable in monetary terms. When reasonable estimates cannot be generated, such as cleanup costs at sites where no remedial investigation or feasible remedy exists, then environmental liability estimates do not include cost estimates for that work. This is generally the case for DOE's PFAS contamination. See Federal Accounting Standards Advisory Board, *FASAB Handbook of Federal Accounting Standards and Other Pronouncements, as Amended* (Washington, D.C.: June 30, 2024).