Chapter 9: Per- and Polyfluoroalkyl Substances (PFAS)

Emerging contaminants of concern, such as per- and polyfluoroalkyl substances (PFAS), bring unique challenges to the Savannah River Site (SRS) as changing regulatory requirements compel the reevaluation of historical and current practices to maintain regulatory compliance and continue to protect human health and the environment. SRS responds to this by:

- Ensuring transparency with regulators and the public
- Being proactive and responsive in anticipating regulatory changes
- Collecting data and information to assess and determine further appropriate actions

2024 Highlights

- The U.S. Department of Energy (DOE), led by the Office of Environment, Health, Safety, and Security, continues to actively assess and understand PFAS presence at DOE sites and to take actions to manage risk.
- The SRS PFAS Working Group (PWG) continued working with DOE by reviewing draft guidance documents and commenting on proposed U.S. Environmental Protection Agency (EPA) rulemaking and initiatives.
- In 2024, SRS sampled 75 wells and 15 surface water stations in D Area for PFAS constituents as part of an ongoing Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) remedial investigation.

9.1 INTRODUCTION

Increased national attention on the topic of per- and polyfluoroalkyl substances (PFAS) has prompted calls for action from federal, state, and local government. It is important to understand the nature and use of PFAS to comprehend the scope of these responses.

PFAS are carbon atoms linked to each other and bonded to fluorine atoms. The fluorination imparts properties to the molecule. The carbons may be partially fluorinated (polyfluorinated) or fully fluorinated (perfluorinated). PFAS are a group of more than 9,000 man-made synthetic chemicals that have been used worldwide in industry and consumer products for more than 70 years. PFAS compounds have numerous different properties and applications depending on the compound chemical structure.

Due to their widespread production and use, as well as their ability to move and persist in the environment, most people in the United States have been exposed to PFAS (CDC as source).

The *2022* and *2023 SRS Environmental Reports* provided detailed explanation regarding background information about PFAS as well as Environmental Protection Agency (EPA), Department of Energy (DOE), and Savannah River Site (SRS) initiatives.

For more information about per- and polyfluoroalkyl substances (PFAS) you may go to the following resources:	
2022 and 2023 SRS Annual Site Environmental Report	https://www.srs.gov/general/pubs/ERsum/index.html
Department of Energy PFAS Webpage	https://www.energy.gov/pfas/pfas-and-polyfluoroalkyl-substances
Environmental Protection Agency PFAS Webpage	https://www.epa.gov/pfas

9.2 STATUS OF PFAS REGULATIONS AND GUIDANCE

PFAS had followed a pattern of emergency and awareness similar to many other regulated environmental contaminants, such as 1,4-dioxane. Figure 9-1 provides a general timeline of PFAS manufacturing, use, and awareness leading to the development of regulation of PFAS in the United States.

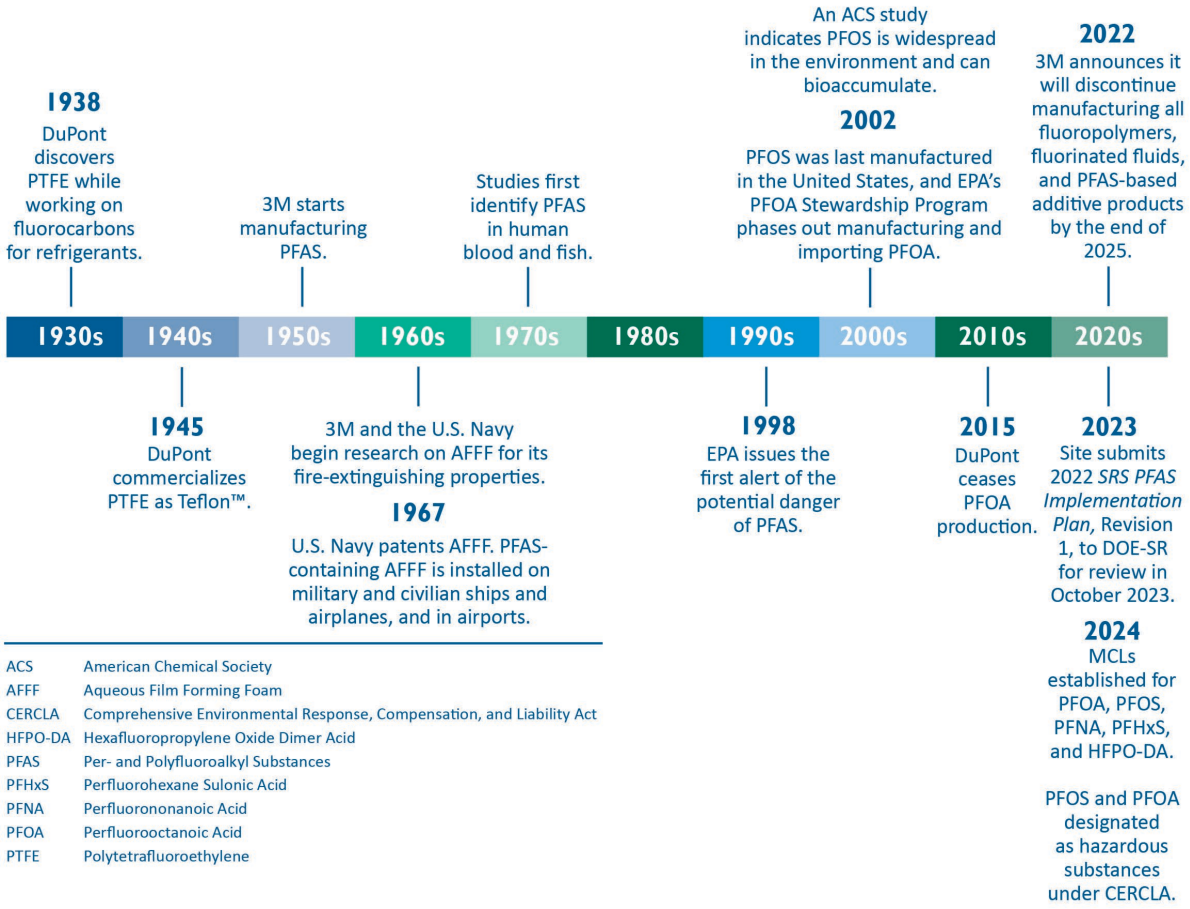

Figure 9-1 Key Dates in the Development and Regulation of PFAS in the United States

9.2.1 U.S. Environmental Protection Agency (EPA)

EPA's PFAS Strategic Roadmap identifies EPA's whole-agency approach to PFAS. EPA made specific commitments to action for 2021 through 2024. EPA's integrated approach to PFAS focuses on three central directives: research, restrictions, and remediation. These planned actions represent important and meaningful steps to safeguard communities from PFAS contamination.

2024 highlights of the EPA's regulatory initiatives include the following:

- Published its final National Primary Drinking Water Regulation for six PFAS chemical compounds (perfluorooctanoic acid [PFOA] and perfluorooctane sulfonic acid [PFOS], perfluorononanoic acid [PFNA], hexafluoropropylene oxide dimer acid [HFPO-DA, commonly known as GenX Chemicals], perfluorohexane sulfonic acid [PFHxS], and perfluorobutane sulfonic acid [PFBS]) (Federal Register, April 26, 2024)
- Finalized a critical rule to designate two widely used PFAS – PFOA and PFOS – as hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as Superfund (Federal Register, May 8, 2024).
- Published final science-based water quality concentrations for 10 PFAS chemicals that will help states and tribes protect fish and other aquatic life from these chemicals (Federal Register, October 7, 2024)
- Released updated interim guidance on the destruction and disposal of PFAS-containing materials, building on earlier guidance from 2020.

9.2.2 U.S. Department of Energy

DOE is committed to the health and safety of the public and its workers and to protecting the environment. DOE's goal is to protect human health and the environment in transparently assessing and addressing the presence of PFAS at DOE sites while deploying its scientific expertise to solve PFAS challenges. DOE's efforts to address PFAS are aligned with its goals for safe, clean and thriving communities. DOE recognizes its responsibilities to address the environmental legacy from its activities.

In 2024, DOE continued to engage with federal and state regulators, as well as local communities and tribes regarding PFAS at its sites. DOE is committed to collaboration and keeping stakeholders and the public informed about its activities related to PFAS.

Managing the risk of PFAS requires a coordinated approach. The promulgation by the EPA of key PFAS regulations and guidance enabled DOE to adjust internally developed controls to remain aligned with federal policy. As a result, DOE lifted its suspension on disposal of PFAS-containing wastes, established by a September 2021 memorandum. Effective December 18, 2024, DOE sites must store and dispose of such materials in accordance with applicable regulatory requirements.

The DOE PFAS Working Group (PWG) continued to meet in 2024 to implement its established goals of working with DOE sites to exchange and gather information, educate DOE sites on PFAS, identify

potential PFAS contamination issues, understand PFAS operations and use at DOE sites, and share lessons learned regarding PFAS.

9.2.3 Savannah River Site

In response to the DOE directives, SRS established its own PWG in March 2022. In 2024, the SRS PWG continued to serve as a Site-level conduit to communicate EPA and DOE updates on PFAS in the form of regulatory changes and guidance.

As part of the DOE PFAS Strategic Roadmap commitments, DOE-HQ prepared a draft *Updated Assessment of Per- and Polyfluoroalkyl Substances at Department of Energy Sites*. SRS provided input on that report to accurately reflect the status of PFAS activities at SRS during the reporting period.

SRS continues to review and comment on regulatory actions and guidance, both from EPA and DOE, to ensure that the site maintains cutting-edge knowledge of impending changes that impact site operations.

9.3 ONGOING SRS PFAS ACTIVITIES

SRS is working with federal and state regulators to comply with complex and changing regulations and directives associated with PFAS contaminants. SRS is actively engaged in responding to the emerging requirements for PFAS as discussed in the following sections.

9.3.1 PFAS-Containing Aqueous Film Forming Foam (AFFF) Discontinuance and Disposal

SRS maintained the AFFF concrete blocks, which were stabilized and solidified in 2020, including performing routine inspections. In light of lifting the disposal moratorium in December 2024, SRS intends to identify the appropriate disposition path based on the 2024 EPA guidance as well as DOE guidance.

SRS identified a closed automatic fire suppression system tank containing approximately 250 gallons of PFAS-containing AFFF concentrate. The system was closed and isolated in the early 2000s and is considered removed from service. The system is equipped with secondary containment and is inspected monthly. This AFFF is not available for use. The AFFF concentrate remains stored in the tank until a disposition pathway is determined.

9.3.2 D Area Groundwater

AFFF was used at D Area in the fire-training areas and in response to a fire-suppression event at a D Area gas station. SRS, in coordination with EPA and South Carolina Department of Environmental Services (SCDES), has been assessing the nature and extent of associated groundwater contamination as part of the CERCLA Core Team process under the Federal Facility Agreement (FFA).

In fourth quarter 2024, SRS continued groundwater and surface water sampling for PFAS at locations spread across D Area and within the Savannah River. Data collected will be provided to EPA and SCDES

in 2025.

Additionally, SRS conducted soil and concrete sampling to help characterize potentially known sources of PFAS contaminated areas in D Area including the 411-1D/411-3D Fire Fighting Training Area (FFTA) and 715-D Gasoline Station area. These results will be presented to EPA and SCDES in 2025. Chapter 7, *Groundwater Management Program*, includes all relevant PFAS data collected in 2024.

SRS continues to assess Site-specific uses and locations when new information regarding historical use of PFAS is documented or sampling identifies PFAS contaminants. As needed, CERCLA investigations, including sampling and analysis, will be developed with input by EPA and SCDES. Public notice of all actions will follow the existing CERCLA process, and SRS will share data within future SRS Environmental Reports.

9.3.3 Savannah River National Laboratory (SRNL) Technology Development Grant

At the request of DOE Office of Environmental Management (DOE-EM), SRNL organized a virtual PFAS in Soils Workshop, which was held on November 15, 2024. The workshop emphasized the dynamic regulatory and scientific environment surrounding PFAS as a contaminant of concern across many DOE-EM sites. An overview of the role of both state and federal PFAS regulations was provided by SRNL's Regulatory Center of Excellence (RCE). A presentation by the Consortium for Risk Evaluation with Stakeholder Participation (CRESP) provided an overview of five areas of PFAS research their team is addressing, including identifying advancements and gaps. Pacific Northwest National Laboratory (PNNL) presented a case study on PFAS soil contamination that was detected following the removal of a tank previously used to store AFFF. Discussions after each presentation in combination with a closing discussion with DOE-EM identified key themes and needs where DOE guidance is desired. These included funding, PFAS prioritization, and a need for guidance on background, uncertainty, and required actions. A summary report from the workshop discussions was written and provided to DOE-EM.

9.3.4 University of Georgia's Savannah River Ecology Laboratory (SREL) Ongoing Research

SREL completed one PFAS project and initiated planning of two new studies in 2024:

- The initial characterization of PFAS project at SRS was completed. The data from surface sediment, surface water, and fish were included in the thesis, *Spatial Dynamics and Bioaccumulation of Per- and Polyfluoroalkyl Substances on the Savannah River Site, A National Environmental Research Park*.
- A study to focus on novel PFAS passive samplers, which provide a more accurate snapshot of environmental concentrations compared to traditional grab samples. This project is in the planning stage; research will not begin until spring/summer 2025.
- A study investigating PFAS in fish at SRS. This project is in the planning stage; research will not begin until spring or summer 2025.

In addition to these research projects, SREL is setting up its own PFAS analysis lab.

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