Per-and polyfluoroalkyl substances (PFAS) Management at SRS

Scott Kuhn
SRNS Senior Environmental Engineer

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Presentation Outline

- Introduction
- PFAS – What, Who, When, Where, Why
- Environmental Protection Agency and Recent Regulatory Initiatives
- Department of Energy
- Savannah River Site – Initiatives, Sampling, Continuing Actions

Introduction

Emerging contaminants of concern bring unique challenges to the Savannah River Site (SRS) as changing regulatory requirements compel reassessment and analysis of historical and current practices to maintain compliance and protect human health and the environment. SRS responds to this by

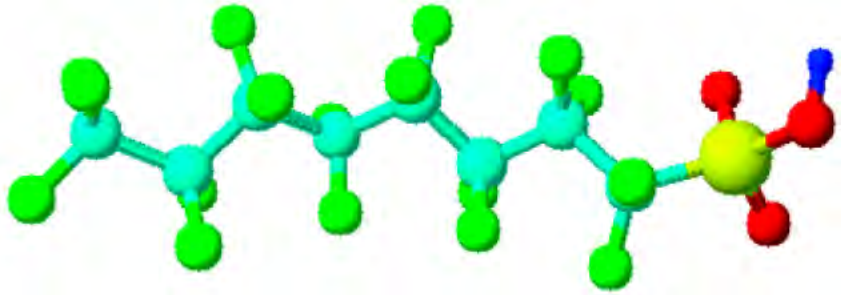
- Ensuring transparency with regulators and the public regarding Site issues
- Being proactive and responsive in anticipating regulatory changes
- Collecting data and information for thorough evaluations and/or responses

Increasing national attention to per- and polyfluoroalkyl substances (PFAS), also known as “forever chemicals”, 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 evaluations and responses.

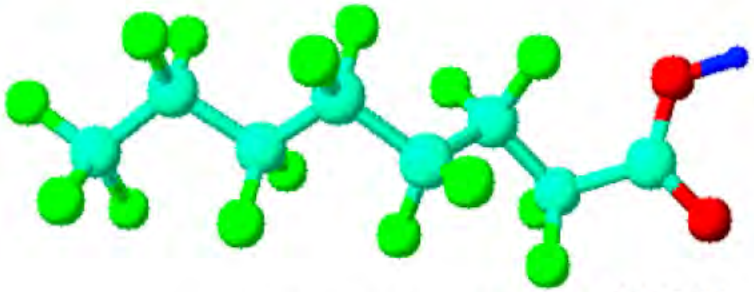
PFAS – What Are They?

Per- and polyfluoroalkyl substances (PFAS) are a broad group of man-made chemicals with numerous different properties and applications.

- **Chemicals within the group are categorized by their chemical and physical properties including:**
  - Repelling oil (oleophobic), water (hydrophobic), stain, and soil
  - Providing chemical and thermal stability
  - Reducing friction
- **PFAS include over 4,700 individual chemicals. Most studied include perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS)**



Perfluorooctanesulfonic Acid (PFOS)

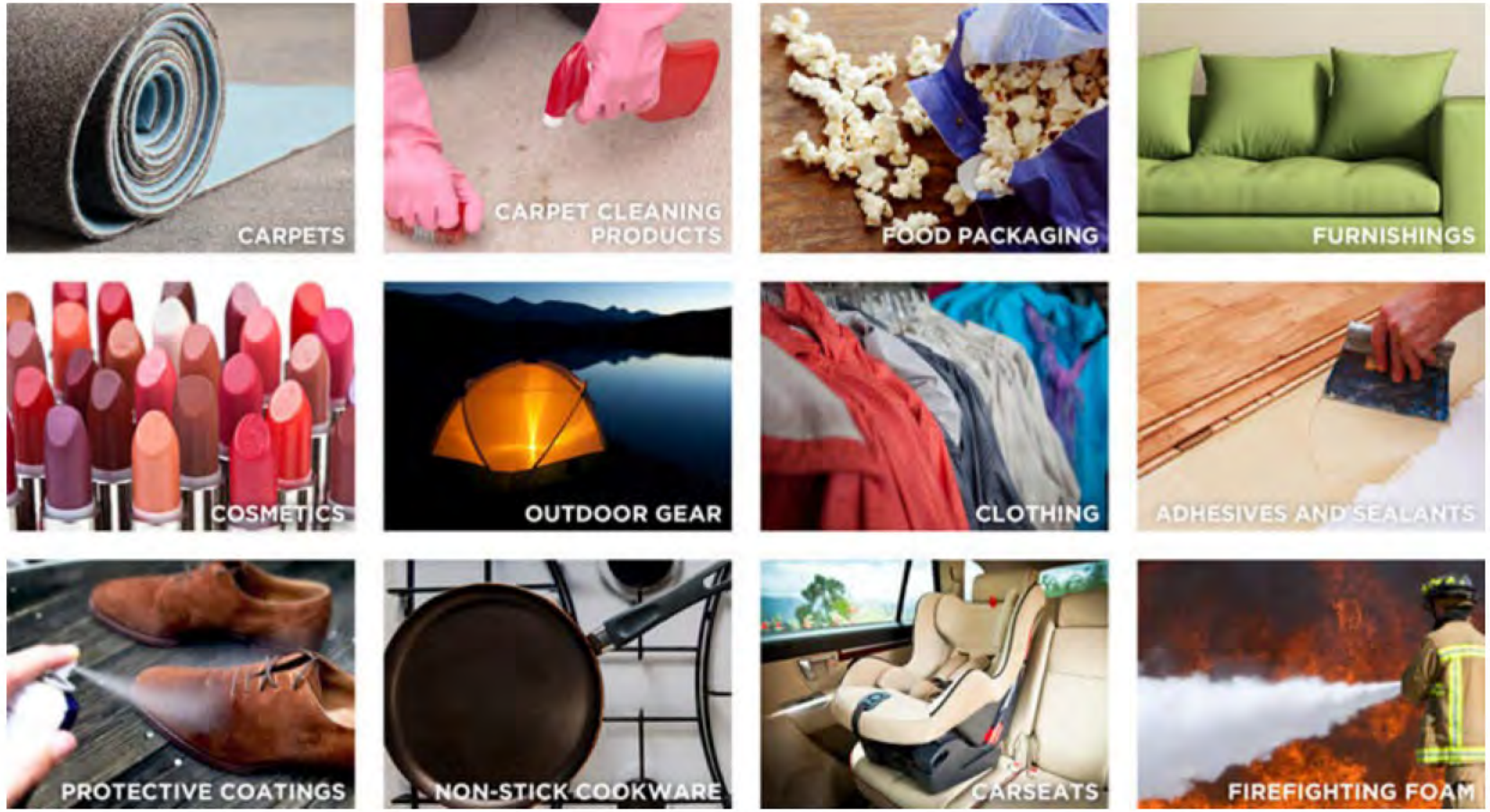


Perfluorooctanoic Acid (PFOA)

Source: https://www.mdpi.com/2073-4441/12/12/3590

PFAS – Who Uses Them?

EVERYONE



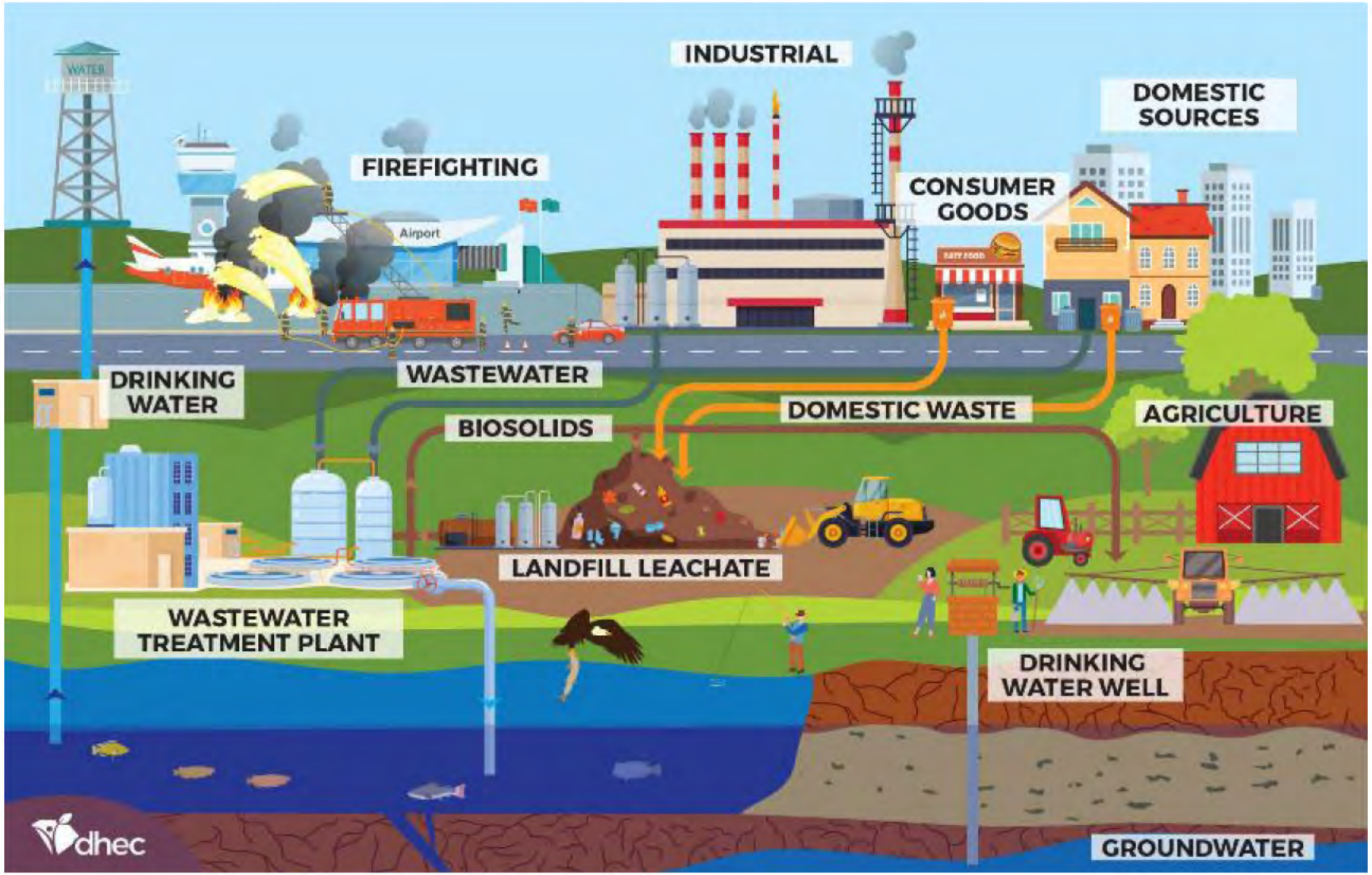
Source: https://greensciencepolicy.org/harmful-chemicals/pfas/

PFAS - When Were They Used?

- 1938 DuPont discovered PTFE while working on fluorocarbons for refrigerants.
- 1945 DuPont commercialized PTFE as Teflon.
- 1950s 3M started manufacturing PFAS .
- 1960s 3M and the US Navy began research on Aqueous Film-Forming Foam (AFFF) and in 1967, the US Navy patented AFFF .
- 1970s First studies identified PFAS in human blood and fish.
- 1998 EPA issued first alert of potential danger of PFAS .
- 2000 Study by American Chemical Society indicated PFOS was widespread in the environment and can bioaccumulate .
- 2002 3M ceased production of PFOS .
- 2015 DuPont ceased production of PFOA .
- 2022 3M announces it will discontinue manufacturing all fluoropolymers, fluorinated fluids, and PFAS-based additive products by the end of 2025

Source: NAEM, Requirements for PFAS Cleanup and Safe Handling, Sept 28, 2023

PFAS – Where Do We Find Them?

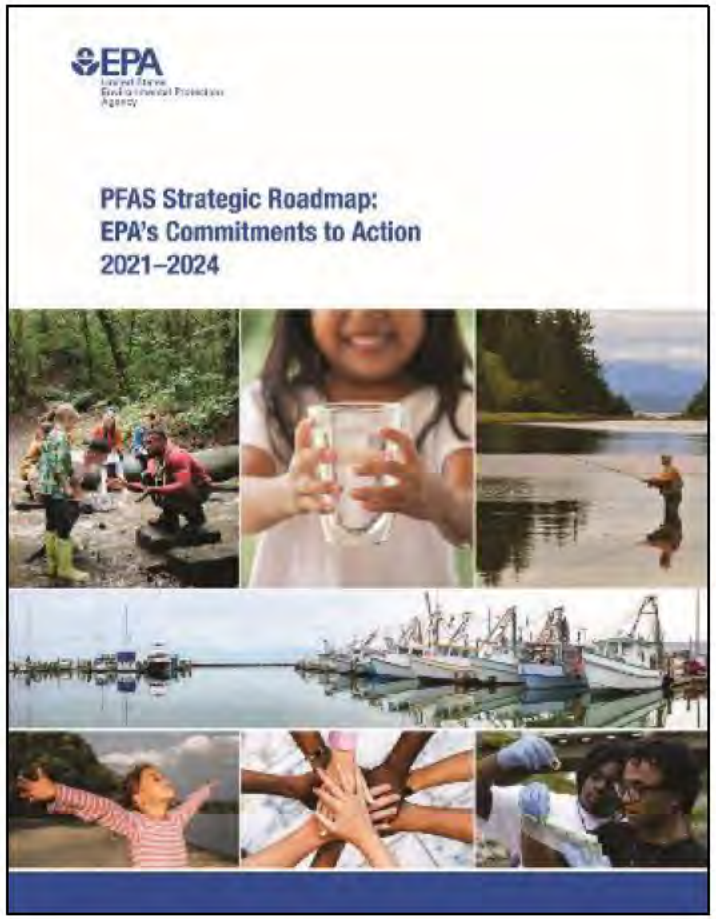


PFAS – Why Do We Care?

- Due to their widespread production and use, as well as their ability to move and persist in the environment, surveys conducted by the Centers for Disease Control and Prevention (CDC) show that most people in the US have been exposed to some PFAS.

- Current peer-reviewed scientific studies have shown that exposure to certain levels of PFAS may lead to:
  - Reproductive effects such as decreased fertility or increased high blood pressure in pregnant women.
  - Developmental effects or delays in children, including low birth weight, accelerated puberty, bone variations, or behavioral changes.
  - Increased risk of some cancers, including prostate, kidney, and testicular cancers.
  - Reduced ability of the body's immune system to fight infections, including reduced vaccine response.
  - Interference with the body's natural hormones.
  - Increased cholesterol levels and/or risk of obesity.

- **EPA's PFAS Strategic Roadmap is the driver for all regulatory actions related to PFAS.**
- **The EPA's whole-agency approach to PFAS focuses on three central directives:**
  - Research - Invest in research, development, and innovation to increase understanding of PFAS exposures and toxicities, human health and ecological effects, and effective interventions that incorporate the best available science.
  - Restrict - Pursue a comprehensive approach to proactively prevent PFAS from entering air, land, and water at levels that can adversely impact human health and the environment.
  - Remediate - Broaden and accelerate the cleanup of PFAS contamination to protect human health and ecological systems.



https://www.epa.gov/system/files/documents/2021-10/pfas-roadmap_final-508.pdf

Recent Federal Regulatory Initiatives

- 9 PFAS added to the Toxic Release Inventory (TRI) chemical list to be reported starting in reporting year 2023; forms due 7/1/2024
- Proposed Rule to eliminate the de minimis exemption for reporting of PFAS under TRI; published in the Federal Register (FR) on 12/5/2022
- Nationwide monitoring for PFAS in drinking water under the fifth Unregulated Contaminant Monitoring Rule by EPA
- Proposed Rule to designate certain PFAS as CERCLA hazardous substances requiring reporting of PFOA and PFOS releases; published in the FR on 9/2/2022
- Proposed National Primary Drinking Water Regulation (NPDWR) for six PFAS; published in the FR on 3/29/2023:
  - PFOA – 4.0 ppt
  - PFOS – 4.0 ppt
  - PFAS mixture (PFNA, HFPO-DA, aka GenX chemicals, PFHxS, and PFBS) – Hazard Index* of 1.0

* The Hazard Index (HI) is used to understand health risks. For the PFAS NPDWR Proposal, the HI considers the combined toxicity of PFNA, GenX Chemicals, PFHxS, and PFBS in drinking water.

- In response to the EPA's roadmap, DOE issued its own PFAS Strategic Roadmap, *DOE Commitments to Action 2022-2025,* in August 2022. The Roadmap outlines DOE's overall approach, goals, objectives, and planned actions to assess and manage PFAS risk at DOE sites to help protect human health and the environment. The roadmap is based on the following four pillars:

https://www.energy.gov/pfas/articles/pfas-strategic-roadmap-doe-commitments-action-2022-2025

DOE Initiatives

- September 16, 2021, The Deputy Secretary of Energy issues a Policy Memorandum to Heads of Department Elements addressing Per- and Polyfluoroalkyl substances at DOE Sites
  - Discontinues use of PFAS-containing AFFF for training purposes and allows use only in actual fire emergencies. No new PFAS-containing AFFF systems may be installed.
  - Specific requirements for storage and disposal of PFAS-containing AFFF are established.
  - Sites must report any new PFAS-containing AFFF release or spills to DOE Headquarters.
  - DOE-HQ will work in coordination with Program Offices to appropriately characterize historic PFAS use and releases at DOE sites.
  - Each Program Office shall designate a representative to serve on a new PFAS Coordinating Committee.
    - The mission of the PCC is to track progress in meeting the requirements of the Policy, identify necessary changes to Departmental orders and directives or regulations to achieve Policy objectives, and initiate coordination with the DOE Directives Review Board to implement necessary changes to Departmental directives.
  - DOE has issued several guidance documents to assist sites in dealing with implementing the Policy

Savannah River Site Initiatives

- March 2022; SRS establishes the PFAS Working Group (PWG). The PWG serves as a Site-level conduit to the DOE PFAS Coordinating Committee.
  - The PWG will research interpretation on aspects of PFAS issues.
  - The PWG will investigate PFAS usage at SRS and recommend remedies for management in accordance with regulatory guidelines.
  - The PWG may develop advisory or tactical recommendations to DOE-SR management on specific PFAS issues and objectives.
  - The PWG will work with regulators and stakeholders to develop solutions designed to mitigate the impact of PFAS.
- As part of the DOE-Roadmap commitments, SRS developed the SRS PFAS Implementation Plan and submitted it to DOE-HQ in December 2022.
  - The Plan documents the actions that will be taken at SRS to implement DOE's Strategic Roadmap.
  - This will be accomplished by leveraging the expertise at SRS, as well as DOE's National Laboratories to develop technically sound solutions.

SRNS PFAS Sampling

- SRS reviewed its historical uses of PFAS and determined that 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.
- In 2022, SRS sampled 65 wells and 10 surface water stations in D Area for PFAS constituents as part of CERCLA remedial investigation efforts. PFAS has been identified in groundwater.
- Current work is focusing on obtaining a complete data set to adequately assess the nature and extent of PFAS in the groundwater in support of future decision making.

PFAS Continuing Actions

- SRS is committed to evaluating the full nature and extent of PFAS contamination at the site.

- SRS increased transparency on PFAS activities by including a new chapter in the annual SRS Site Environmental Report. A link to the DOE PFAS website has been established on the SRS website. https://www.energy.gov/pfas/pfas-and-polyfluoroalkyl-substances

- The Site continues to comply with all laws and regulations as they are promulgated.

- SRS actively interacts with the Department of Energy's PFAS Coordinating Committee and PFAS Working Group to implement Department policies designed to address PFAS issues and protect human health and the environment.

Summary

- PFAS are a broad class of more than 4,700 man-made organic chemicals, that are pervasive in the environment due to their long-standing use in consumer, commercial and industrial products and applications.
- EPA has developed a Strategic Roadmap which lays out a whole-of-agency approach to addressing PFAS. The roadmap sets timelines by which EPA plans to take specific actions and commits to new policies to safeguard public health and protect the environment.
- DOE issued it's PFAS Strategic Roadmap, *DOE Commitments to Action 2022-2025.* The Roadmap outlines DOE's overall approach, goals, objectives, and planned actions to assess and manage PFAS risk at DOE sites to help protect human health and the environment.
- SRS developed an Implementation Plan and established its PFAS Working Group to implement current and future requirements.
- SRS continues to monitor groundwater for PFAS and coordinate activities with SCDHEC and USEPA.