

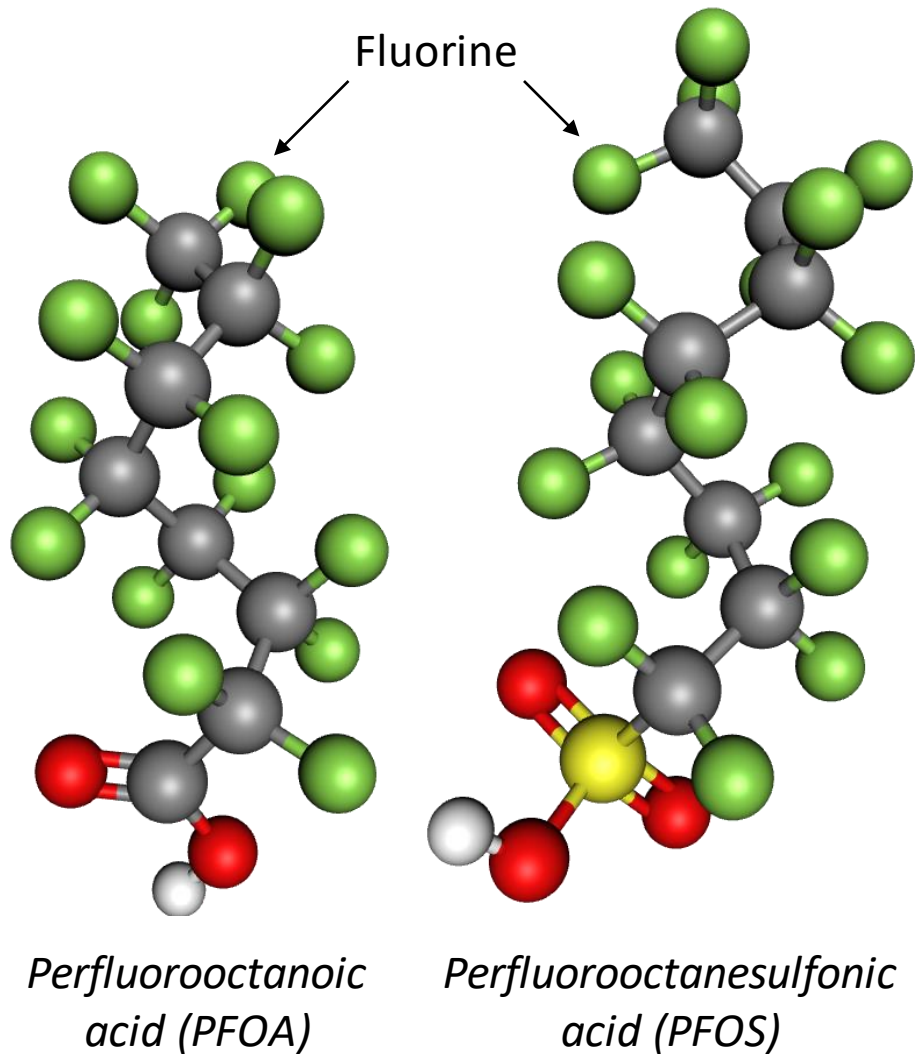
Expanding the Scientific Foundation for Understanding and Addressing Risks from PFAS

Susan Burden, Ph.D.



The views expressed in this presentation are those of the author and do not necessarily reflect the views or policies of the U.S. Environmental Protection Agency.

Per- and Polyfluoroalkyl Substances (PFAS)



A class of synthetic chemicals

- Features chains of carbon atoms surrounded by fluorine atoms
- Wide variety of chemical structures, from single molecules to polymers

Used in homes, businesses and industry for decades

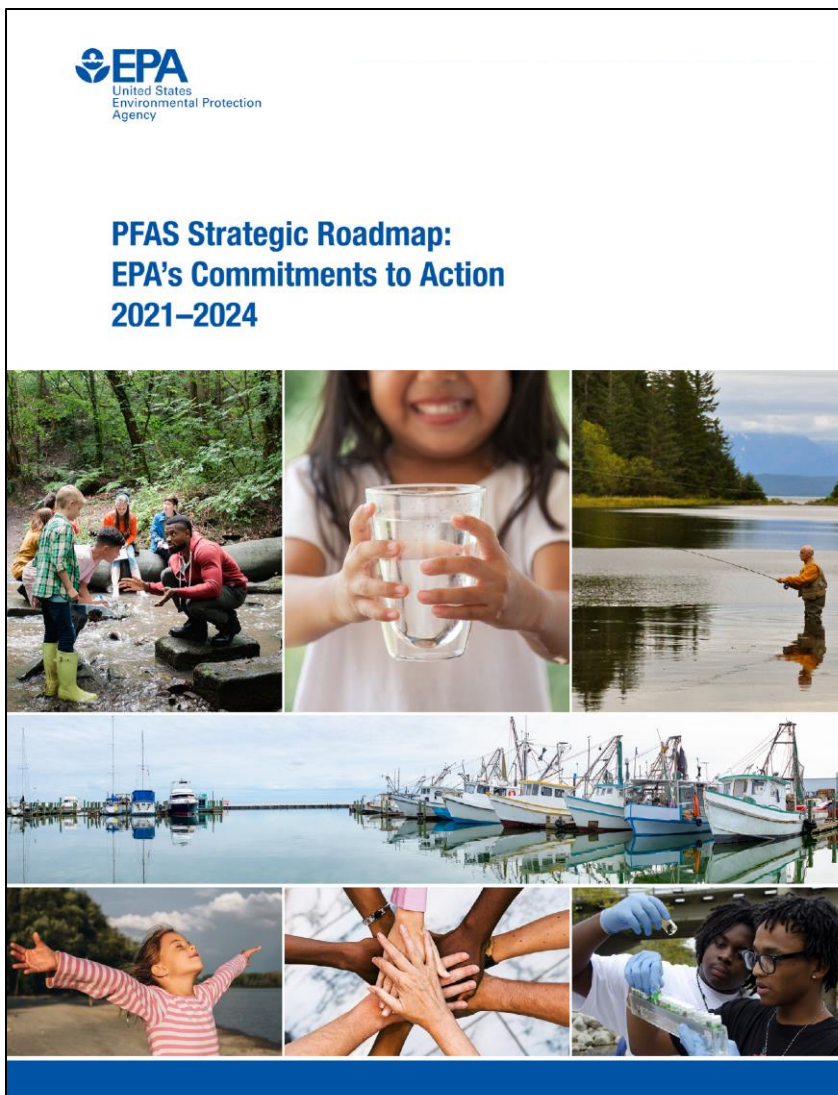
- Have been detected in soil, water and air samples
- Most people have been exposed to PFAS

Some PFAS are known to be PBT

- P = Persistent in the environment
- B = Bioaccumulative in organisms
- T = Toxic at relatively low levels

EPA PFAS Strategic Roadmap

- Released October 2021
- Presents EPA's whole-of-agency approach to protect public health and the environment from the impacts of PFAS
- EPA's approach is centered around the following principles:
 - Consider the lifecycle of PFAS
 - Get upstream of the problem
 - Hold polluters accountable
 - **Ensure science-based decision making**
 - Prioritize protection of disadvantaged communities



PFAS Research and Development

Advance the science to assess human health and environmental risks from PFAS

Hazard

- Human health and ecological effects
- Dose-response

Exposure

- Chemical identity and concentration
- Source-to-receptor pathways

Risk Assessment



Evaluate and develop technologies for reducing PFAS in the environment

- Drinking water and wastewater treatment
- Site remediation
- Destruction (e.g., incineration)
- Disposal (e.g., landfills)



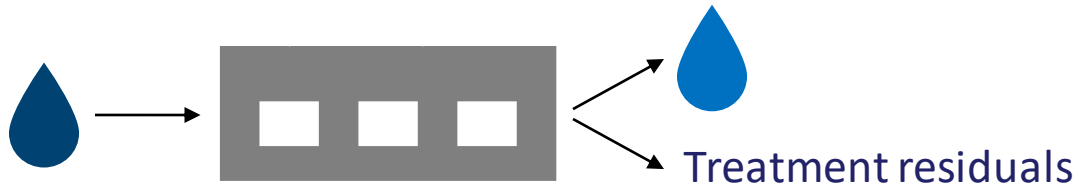
Develop methods and approaches for measuring PFAS

Targeted methods | “Total PFAS” methods | Non-targeted methods

Risk Management Research

Water Treatment

Goal: Remove or reduce PFAS in drinking water and wastewater

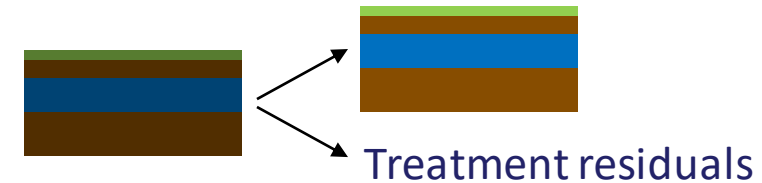


Research Highlights

- [Polanyi adsorption potential theory for estimating PFAS treatment with activated carbon](#) (2023)
- [Drinking Water Treatability Database](#)

Site Remediation

Goal: Remove or reduce PFAS at contaminated sites (e.g., in soil, sediment, groundwater)

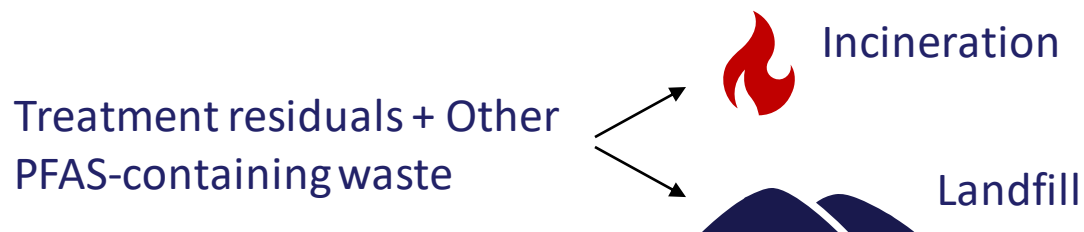


Research Highlights

- [Introduction to PFAS in groundwater](#) (2022)
- [Investigation of an immobilization process for PFAS-contaminated soils](#) (2021)

Destruction and Disposal

Goal: Prevent re-introduction of PFAS into the environment through destruction or containment



Research Highlights

- [A critical review of PFAS landfill disposal in the US](#) (2023)
- [Pilot-scale thermal destruction of PFAS in a legacy AFFF](#) (2023)
- SBIR: [Novel technologies for reducing PFAS in the environment](#)

References

EPA Activities

- US EPA. PFAS Strategic Roadmap: EPA's Commitments to Action 2021-2024. 2021. https://www.epa.gov/system/files/documents/2021-10/pfas-roadmap_final-508.pdf.
- US. EPA. Research on PFAS. <https://www.epa.gov/chemical-research/research-and-polyfluoroalkyl-substances-pfas>.

Water Treatment

- Burkhardt et al. Polanyi adsorption potential theory for estimating PFAS treatment with granular activated carbon. *J. Water Process. Eng.* **2023**, 53, 103691. DOI: 10.1016/j.jwpe.2023.103691.
- US EPA. Drinking Water Treatability Database. <https://tdb.epa.gov/tdb/home>.

Site Remediation

- US EPA. Introduction to PFAS in Groundwater [EPA/600/R-22/066]. 2022. https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=CESER&dirEntryId=355495.
- Barth et al. Investigation of an immobilization process for PFAS contaminated soils. *J. Environ. Manage.* **2021**, 296, 113069. DOI: 10.1016/j.envman.2021.113069.

Destruction and Disposal

- Tolymat et al. A critical review of PFAS landfill disposal in the United States. *Sci. Total Environ.* **2023**, 905, 167185. DOI: 10.1016/j.scitotenv.2023.167185.
- Shields et al. *ACS EST Engg.* **2023**, 3 (9), 1308-1317. DOI: 10.1021/acsestengg.3c00098.
- US EPA. EPA's SBIR Support of PFAS Detection and Treatment: Novel Technologies for Reducing PFAS in the Environment. <https://www.epa.gov/sbir/epas-sbir-support-pfas-detection-and-treatment-novel-technologies-reducing-pfas-environment>.