Clean Harbors

PFAS Management Framework

Spring 2026

Where we are today

- PFAS management remains a top priority at both the local and federal level.

- The coordinated efforts of EPA and DoW are driving the national approach to PFAS management.
  - DoW PFAS Task Force issued guidance on the destruction and disposal of PFAS – lifting the ban on incineration.
  - EPA agreed to update PFAS Disposal Guidance annually
  - Both agencies have emphasized the need for safe, secure, and permitted disposal/destruction pathways for PFAS-containing materials
  - To date, neither has clearly stated **how to manage PFAS waste in different matrixes** (water, soil, contaminated waste, etc.) and how to manage PFAS contamination from emergency events (IE: fire fighting foam used to put out fires).

- Regulators and remediation practitioners increasingly recognize that **no single technology can address all PFAS waste streams**.

- Effective management requires **a tiered framework that aligns treatment technology with PFAS concentration, waste form, and regulatory requirements.**

- Clean Harbors multi-technology, concentration-based framework offers a practical and proven pathway for safely managing PFAS waste streams generated through remediation efforts.

Clean Harbors PFAS Management & Destruction Supports National & Local Priority

PFAS Task Force Goals

- Mitigating and eliminating use of AFFF
- Fulfilling our cleanup responsibilities related to PFAS
- Understanding the impacts of PFAS on human health
- Expanding PFAS-related public outreach
- Supporting PFAS research efforts

Clean Harbors is the Leader in PFAS Management Technologies and Innovation
Rigorous testing and deep experience.

- September 2025 EPA published results from the 2024 successful collaborative test with the Department of War and EPA.
- Clean Harbors Co-CEO Eric Gerstenberg testified at the November Senate EPW Committee hearing and offered the company PFAS management matrix as a cost-effective roadmap to clean up these chemicals.
- DoW Updated PFAS Destruction Guidance Published March 2026 – lifts incineration ban
- Supports cleanup efforts at military installations across the country, protecting service members, surrounding communities, and the environment.
- Awaiting EPA's annual updated Interim Guidance.

Industry and government coming together to solve the toughest PFAS challenges

Emergency Response

- UPS Plane crash (2025)
- LA Fires (2025)
- Norfolk Southern Train Derailment (2023-2024)
- COVID decontamination (2020-22)
- Avian flu outbreak (2015)
- Hurricane Sandy (2012)
- Yellowstone River spill (2011)
- Kalamazoo River spill (2010)
- Deepwater Horizon spill (2010)
- Hurricanes Katrina and Rita (2005)
- Anthrax attack cleanup (2001)
- 9/11 World Trade Center (2001)
- Eldia tanker on Cape Cod (1984)

Responded to over 22,000 Emergency Response Events in 2025

Louisville KY, UPS Plane Crash Emergency Response

- November 2025 - UPS Flight 2976 disaster in Louisville – fatalities and widespread ground destruction
- Complex tragedy involving a warehouse, oil refinery and near Ohio River.

Clean Harbor's Response

- Quickly mobilized a diverse team from across the company and country
- 226K gallons of oil, 38K jet fuel, 18K antifreeze, AFFF - (PFAS)
- Impact to 111 businesses and 4.5 miles of rivers and creeks
- Five boom deployment collections sites. PFAS water filtration systems employed.
- 150k hours worked
- Waste was safely disposed at three Clean Harbors facility locations: Sarnia Lone Mountain, El Dorado

In January 2026, Mayor Craig Greenberg noted that Clean Harbors has done an "exceptional job" in managing the unprecedented environmental challenges of the site.

Successful PFAS Clean Ups

Delta Airlines AFFF foam release

- An estimated 2,000 gals of AFFF foam released into a hangar.
- Clean Harbors provided ER containment and decontamination services. PFAS filtration of estimated 3M gals

Drinking water treatment: Mobile and Fixed

- Wellesley, MA: 750 gpm PFAS drinking water wellhead system treating 4.5 million gallons per day
- Stationary system at confidential client treating 4.5 million gallons per day

Clean Harbors Total PFAS Solution

- Studies in 2021, 2022 and 2024 found PFAS destruction at CLH incinerator to be 99.9999% effective via high-temperature thermal destruction technologies.
- In September 2025, the U.S. Environmental Protection Agency (“EPA”) published results from the 2024 collaborative test with the Department of War and Clean Harbors.
- “Results showed that the measures of the incinerator’s ability to destroy or remove contaminants . . . ranged from 99.95 to 99.9999 percent for the added PFAS.”
- **Emissions testing using latest EPA test methods proved no fluorinated organic emissions. IE: no PIDs formed during combustion.**
- The EPA concluded that the September 2025 test “is the most comprehensive PFAS incineration test to date and provides valuable data about PFAS incineration.”

EPA Admin Lee Zeldin Visiting Clean Harbors Deer Park incinerator Fall 2025

Proven PFAS Framework Demonstrated by Clean Harbors

- **Clean Harbors has spent years developing and implementing a comprehensive PFAS management framework** using existing, permitted environmental infrastructure.
- This approach leverages **multiple technologies—including high-temperature RCRA permitted incineration, engineered landfill containment, and water treatment systems—to manage PFAS safely and responsibly.**
- The framework is based on **matching treatment technologies to the concentration and physical form of PFAS waste**, ensuring materials are managed in the most appropriate, cost effective and protective way.
- This **tiered approach mirrors the way regulators and remediation practitioners already address complex environmental contaminants**, using a combination of destruction, containment, and treatment technologies.
- As PFAS remediation accelerates nationwide, **this integrated framework provides a practical and scalable model for industry and government partners.**

Clean Harbors PFAS Management Framework

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Technology	Total PFAS limit	Waste examples
RCRA permitted high temperature incineration *(does not include waste to energy or boilers)*	Lower range – 1 PPM Upper range – no limit	• AFFF concentrate. • Water from emergency response events • Liquids or solids from Military site remediation
Subtitle C landfills	Lower range – 20 PPB Upper range – 1 PPM	• Soil • Soil from emergency response events • Solids from Military site remediation
Subtitle D landfills	Lower range – 2 PPB Upper range – 20 PPB	• Soil • Construction debris • Deactivated biosolids
Industrial wastewater treatment	Lower range – NA Upper range – 1 PPM	• Industrial water
Municipal wastewater treatment plants	Lower range – NA Upper range – 1 PPM	• Stormwater • Households • Industrial discharges • Biosolids dewatering
Drinking water treatment	Lower range – NA Upper range – 30 PPB	• Potable water • Mobile wellhead treatment • Stationary systems

Importance of a PFAS Management Framework

- Addressing PFAS contamination requires **a range of technologies designed for different waste types and concentration levels**.
- Regulators and remediation practitioners increasingly recognize that **no single technology can address all PFAS waste streams**.
- Effective management requires **a tiered framework that aligns treatment technology with PFAS concentration, waste form, and regulatory requirements**.

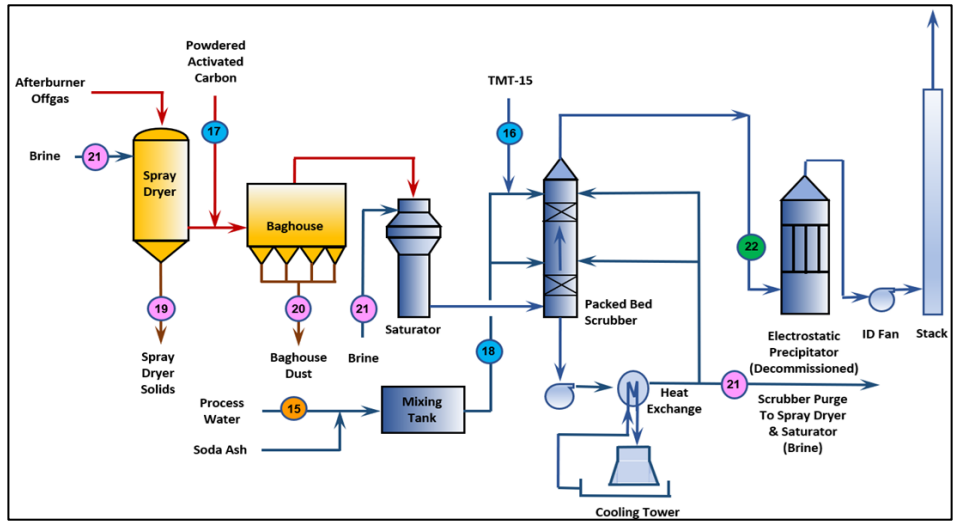
A Closer Look at RCRA Incineration Facilities

WILL REMOVE/ PUT IN APPENDIX FOR INCINERATION EXPERTS

Critical advantages of RCRA Incineration Facilities

- **Purpose-built for hazardous waste destruction:** RCRA-permitted incinerators are designed to operate at sustained high temperatures necessary to break down complex chemical bonds, including those present in PFAS compounds.
- **Comprehensive regulatory oversight:** These facilities operate under rigorous federal and state regulatory programs that include continuous emissions monitoring, strict operating conditions, and regular inspections to ensure compliance with EPA's most stringent standards.
- **Critical but limited national infrastructure:** Only a small number of commercial-scale RCRA-permitted hazardous waste incinerators operate in the United States, making them a scarce but essential component of the nation's environmental protection infrastructure.

RCRA incinerators have state of the air emission control systems.



Facilities mistaken for incinerators — such as cement kilns, industrial boilers, specialty furnaces, or municipal waste-to-energy plants—**are not designed, permitted, or proven capable of destroying PFAS.** Attempting to process PFAS at these types of facilities risks incomplete destruction, uncontrolled releases, and significant environmental and public health consequences.