

| Section Number | Topic                                            |
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| 1.2.1          | <a href="#">Firefighting Foam Inventory</a>      |
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| 1.2.3          | <a href="#">Transition Planning and Guidance</a> |

Firefighting foam continues to be a driving concern as it relates to PFAS and potential impacts to the environment. Important considerations include management of the foam, mitigation once released, and elimination from use. These Priority Topics present updates to some of the information included in [Section 3](#), including the existing Foam Inventory Table ([Table 3-1](#)), as well as recent updates on foam transition planning, guidance, and case studies, including updates to the existing Case Study Table ([Table 3-5](#)).

### 1.2.1 Firefighting Foam Inventory

ITRC continues to inventory both aqueous film-forming foam (AFFF) (foams with intentionally added PFAS) and fluorine-free foams (F3) to provide information regarding product name, manufacturer, and other relevant information. [Table 3-1](#) has been revised and now includes two tabs in the downloadable [Table 3-1 Excel file](#). These include:

1. AFFF Inventory: A compilation of current and historical AFFFs from the DoD (Department of Defense) Qualified Product list ([USDOD 2018](#)), as well as state inventories.
2. F3 Inventory: A compilation of F3 foams from the Interstate Chemicals Clearinghouse (IC2) report titled “PFAS in Firefighting Foam” ([IC2 2019](#)) and GreenScreen for Safer Chemicals website ([Clean Production Action 2024](#)), as well as the DoD Military-Specification 32725 fluorine-free products ([USDOD 2023](#)).

### 1.2.2 Firefighting Foam Ecotoxicity

Recent tests reported in [Fuller et al. \(2024\)](#) on F3s show they are slightly more acutely toxic to aquatic organisms than AFFF, but their chronic toxicity is generally similar or less. The study analyzed the impact of six F3s on six aquatic species, finding that the acute toxicity of several of the F3s was greater than AFFFs with PFAS. Others had similar acute risks to AFFFs with PFAS. Chronic toxicity varied by species and formulation, with some F3s affecting growth and reproduction in specific species. In other testing, [Hossain et al. \(2024\)](#) conducted an acute avian study evaluating one short-chain PFAS-containing firefighting foam and six nonfluorinated firefighting foams. The results indicated that an analyzed F3 has less toxicity on chick growth than AFFF, but both the F3 and AFFF affected embryo development, leading to death of unhatched eggs. Work by [Yeardley et al. \(2024\)](#) compared the acute, chronic, and behavioral effects of two fluorine-free formulations with a PFAS-containing AFFF on two species of earthworms. The study indicated that F3s show varying acute toxicity to earthworms. Earthworms strongly avoided soils treated with F3 and AFFF; however, one F3 was much more acutely toxic than the compared AFFF. These three studies on ecological receptors and similar research provide essential data for selecting less environmentally toxic alternatives to AFFF. These findings, much like with AFFF, strongly suggest that thoughtful consideration should be taken with the selection of F3s and that best management practices (BMPs) continue to be used when handling, storing, applying, and remediating both AFFF and F3. See [Section 3.8.1](#) for more information about BMPs.

### 1.2.3 Transition Planning and Guidance

[Section 3.11](#) includes information about firefighting foam system replacement. The following sections provide updates to the information about transition planning of foam systems from AFFF to F3 and available guidance.

#### 1.2.3.1 State Activity

Several states are actively addressing AFFF, and specifically the transition of AFFF to F3. Many more states have initiated take-back programs or intend to initiate take-back programs. Some states have also developed or refreshed guidance to support foam transitions. According to [Safer States \(2025\)](#), at least seven states will consider policies to eliminate PFAS from firefighting foam, including phase-out, restrictions, or take-back programs. These include Connecticut, Maine, Montana, New Jersey, New York, Oregon, and Pennsylvania. A total of fifteen states has already adopted phaseouts of PFAS in firefighting foams.

State take-back program approaches have varied. According to the Environmental Council of States ([ECOS 2025](#)) compendium of States PFAS Action Report (April 2025), a total of nineteen states has completed take-back (or collection) programs. [ECOS \(2025\)](#) reported disposal of collected AFFF included hazardous waste landfills (10 states), incineration (three

states), destruction technology using supercritical water oxidation (SCWO) (two states), and interim storage until a safe method is identified, or disposal method under development (three states). In addition, [ECOS \(2025\)](#) reported that states have collected over 1,672,500 pounds (which is approximately 167,250 gallons) of AFFF through take-back programs. Costs per gallon vary depending on what type of disposal/destruction method was chosen, as well as what other services may have been included (collection/storage, inventory activities, waste hauling, processing).

### 1.2.3.2 State Foam Transition Guidance

According to [ECOS \(2025\)](#), 32 states have already transitioned at least one fire department or airport from using AFFF to the use of F3, and 33 states have conducted outreach to fire departments, airports, and other users of AFFF ranging from surveying fire departments, coordinating with state fire marshals, setting up informational web pages, developing fact sheets, and coordinating with their state Department of Transportation, among other efforts ([ECOS 2025](#)). States such as Washington and Minnesota have developed guidance to support foam transitions from AFFF to F3. A summary of each guidance document is below.

The Washington Department of Ecology's August 2024 interim guidance, *"Best Management Practices for Deep Cleaning Fire Equipment Contaminated with PFAS-Containing Firefighting Foam in Washington State,"* outlines the following key practices ([WA Dept. of Ecology 2024](#)):

- **No PFAS cleaning standard** currently exists for firefighting equipment.
- **AFFF concentrate and rinsate** must be collected in labeled containers and **cannot** be disposed of in sanitary sewers, septic systems, storm drains, catch basins, or on the ground; disposal must go through a licensed hazardous waste hauler.
- **Foam replacement** should use only Green Screen-certified or DoD-specified F3 products.
- **Before replacement**, systems must be fully drained and dried; drained material should be stored in labeled containers.
- **Sampling of the new F3** at least 20 days after installation and keeping detailed cleaning and replacement records is recommended. PFAS is expected to be detected in the sample results, but it is not intentionally added, and should still be managed using BMPs.
- **Hot water rinsing (110°F-160°F)** of tanks and plumbing is recommended; use glycol-based detergents such as 20% butyl CARBITOL™, FluoroFighter™, or PerfluorAd®; circulate for at least 30 minutes.
- **A second rinse is recommended**, and an optional third rinse is suggested.
- **Sampling of rinsate** for halogenated organic compounds is recommended: if under 100 ppm, coordinate discharge with local publicly owned treatment works; if over 100 ppm, follow Washington State hazardous waste disposal rules.

The Minnesota Pollution Control Agency (MPCA) issued guidance in June 2023 and updated in December 2025 outlining the use and disposal of PFAS-containing firefighting foam ([MPCA 2025](#)). Key points include:

- **Phase-out deadlines:** Municipal and rural fire departments must stop using AFFF by the end of 2023; oil refineries have until the end of 2025 unless they have been explicitly granted a waiver to the end of 2027.
- **Airport requirements:** Airports and users at airports, except for fixed systems in hangars; must phase out PFAS-containing foam by the end of 2025 with fixed systems in airport hangars; by the end of 2027.
- **Usage and reporting:** All PFAS foam use or release must be reported within 24 hours and handled with full containment, collection, and disposal.
- **Disposal protocols:** Foam concentrate must be incinerated or solidified and landfilled as hazardous waste; runoff must be treated with granular activated carbon until PFAS levels meet Minnesota Department of Health guidance values and must be preapproved for sewer disposal.
- **F3 product standards:** Only Green Screen-certified or DoD-qualified F3 foams are permitted for replacement.

### 1.2.3.3 Federal Agency Guidance

Several federal agencies have published guidance pertaining to foam transitions. A summary of those follows:

#### **DoD Guidance for Mobile Systems (March 2024) ([USDOD 2024](#)):**

- **AFFF Phase-Out Deadline:** All land-based use of AFFF containing PFAS must stop by September 30, 2024.
- **Mobile System Requirements:** Mobile systems transitioning from AFFF must be fully drained, rinsed with water, and reconfigured for fluorine-free alternatives. Appropriate spill prevention and containment measures

must be implemented.

#### **DoD Guidance for Fixed Systems (July 2024) ([USDOD 2024](#)):**

- **AFFF Phase-Out Deadline:** All land-based use of AFFF containing PFAS must cease by September 30, 2024.
- **Fixed System Transition:** Fixed systems must be drained, rinsed, and components drip-dried, with containment of foam and rinsate. Accidental releases must be reported if perfluorooctane sulfonic acid (PFOS) or perfluorooctanoic acid (PFOA) exceed 1 pound in a 24-hour period.
- **System Removal or Abandonment:** For abandoned or removed systems, a water rinse and drying process will be conducted before recycling or disposal.
- **Waste Disposal:** AFFF, rinsate, and impacted waste must be disposed of according to the Assistant Secretary of Defense (Energy, Installments, & Environment) ASD(EI&E) Interim Guidance on Destruction or Disposal of Materials Containing PFAS in the US (July 11, 2023)([USDOD 2023](#)). Based on DoD analysis and consistent with USEPA guidance, four options are available including carbon reactivation, hazardous waste landfills, solid waste landfills, and hazardous waste incinerators. Hazardous waste storage may also be considered as well as underground injection control on a site-specific basis and existing or developing treatment or destruction technologies.

#### **Federal Aviation Administration (FAA) Guidance:**

- The FAA has published many documents to support airports with F3 transition planning and guidance. This includes an aircraft transition plan, four CertAlerts, and other materials. The [FAA \(2025\)](#) "Fluorine-Free Foam (F3) Transition for Aircraft Firefighting" website includes links for the documents:
  - **An [FAA Aircraft Firefighting Foam Transition Plan \(2023\)](#)** was published to support transition planning for FAA Part 139 airports. The plan was established in response to a December 2022 congressional directive for FAA to develop "a transition plan that would include all known legislative requirements, personnel training changes, and other operational aspects to be implemented for a certificate holder's transition to MILSPEC F3" ([FAA 2023](#)).
  - **Part 139 CertAlert 23-07** was published to describe availability of F3 on the Navy's Qualified Products List (QPL)
  - **Part 139 CertAlert 23-01** was published to describe new military specification for performance-based standards for F3s for aircraft fires.
  - **Part 139 CertAlert 24-05** was published to describe rinsing procedures for cleaning out mobile systems transitioning from AFFF to F3.
  - **Part 139 CertAlert 24-11** was published to describe testing requirements and outputs after completion of F3 transitions.

#### **Deadline Extension and Support:**

- **Transition Deadline Extension:** The DoD has extended the AFFF transition deadline from September 30, 2024, to September 30, 2025, for both mobile and fixed systems due to the need for more time to replace AFFF with fluorine-free alternatives at 1,500 facilities and 6,000 mobile assets ([USDOD 2024](#)).
- **FAA Support for Airports:** The FAA is supporting airport transitions through the FAA Reauthorization Act of 2024 ([FAA 2024](#)), which includes funding and a PFAS replacement program for the switch to F3. As of September 2025, Congress had not appropriated funding for the PFAS replacement program. Section 767 of the act identifies the "PFAS-related resources for airports" ([FAA 2024](#)).

#### **1.2.3.4 Other Guidance on Foam Transition**

Other governments, as well as organizations representing foam users, have developed guidance on foam transition. Some additional representative guidance is presented below.

##### **Queensland, Australia**

The Queensland Department of Environment & Science released a 2021 policy for managing firefighting foam to minimize environmental harm, based on the precautionary principle. It outlines requirements for handling, transport, storage, use, release, treatment, and disposal of foam, emphasizing the need to assess environmental and health risks ([Queensland Government 2021](#)). Key points include:

- **Hazard assessment criteria:** All foams shall be evaluated for environmental persistence, bioaccumulation, toxicity (acute/chronic), mobility in soil and water, biodegradability, and biochemical oxygen demand.
- **Nonpersistent (fluorine-free) foams:** PFAS levels in systems shall be tested after 1 month of residence in existing system; limits are <10 mg/kg (combined specific PFAS compounds) and <6.4 mg/kg using total organic fluorine (TOF).
- **Management of fluorine-free foams:** Site managers shall take all reasonable and practical steps to contain, treat, or properly dispose of foam and runoff to avoid significant environmental harm.
- **Persistent foams (for example, AFFF):** Concentrates must contain <10 mg/kg PFAS (specified compounds) and <50 mg/kg TOF. These foams must be fully contained on-site and disposed of as regulated waste.
- **Disposal planning:** A disposal plan shall be created within 3 months of the foam being removed from service or deemed surplus.

## The Arctic Council

“The Arctic Council is the leading intergovernmental forum promoting cooperation, coordination and interaction among the Arctic States, Arctic Indigenous Peoples and other Arctic inhabitants on common Arctic issues, in particular on issues of sustainable development and environmental protection in the Arctic. It was formally established in 1996” ([Arctic Council, 2025](#)). In 2021, the Arctic Council initiated transition from AFFF to F3 foams ([Arctic Council 2021](#)), and a transition plan was finalized in August 2023 ([Arctic Council 2023](#)).

### 1.2.3.5 Transition from AFFF to F3 Case Studies

Case studies provide examples of AFFF transitions across industries and geographies globally. The case studies are intended to provide examples of the range of approaches to transition from AFFF to F3 and are not intended to be recommendations for specific approaches at other sites. [Table 3-5](#) includes the case studies collected to date.

Although there are commercial products available intended to clean residual PFAS from AFFF-impacted fire suppression systems, published literature evaluating the occurrence, duration, and concentrations of long-term PFAS rebound after the initial cleaning is lacking ([Nguyen et al. 2025](#); [Bonnet et al. 2025](#); [Vatankhah et al. 2025](#)). PFAS rebound is when a PFAS-free foam is added to a system and PFAS remaining in the system infrastructure leaches back into the foam, making it a foam with PFAS in it. To date, no studies have published decontamination methods that fully remove residual PFAS from interior surfaces as indicated by PFAS rebound into replacement F3. Without aggressive surface agitation, postcleaning PFAS rebound is hard to avoid ([Lang et al. 2022](#)). To determine post-treatment efficiency of AFFF decontamination and before transitioning, swab samples are needed to assess PFAS remaining on surfaces ([Bonnet et al. 2025](#)).

More information pertaining to PFAS and AFFF can be found in [Section 3](#).

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