



Memorandum

To: Chuck Larson, P.E., Manager of Strategic Projects, Town of Nantucket

*From: Jill Greene, P.G.
Emily Schick, P.E.*

Date: September 30, 2022

*Subject: Firefighting Foam Assessment at Town and Private Facilities
Phase 2A Town-wide PFAS Assessment
Town of Nantucket, Massachusetts*

Introduction

On September 14 and 15, 2021, CDM Smith performed site visits on Nantucket, Massachusetts to facilities that currently store, or have historically stored, firefighting foam for fire suppression, as identified in the Preliminary Assessment of PFAS - Town-wide Planning Approach Report (CDM Smith, March 2021). Facilities visited included: Nantucket Fire Department facilities; Downtown Tank Farm; Sun Island Fuel; Boat Basin; and Madaket Marine. Recommendations for fire suppression at bulk fuel storage facilities are outlined in National Fire Protection Association (NFPA) standards; however, the Commonwealth of Massachusetts Department of Fire Services has overall jurisdiction. The Nantucket Memorial Airport (Airport) also stores firefighting foam; however, the Airport must comply with specific Federal Aviation Administration (FAA) requirements and was not included in this review.

For the site visits, CDM Smith personnel were accompanied by Chuck Larson, Town of Nantucket Manager of Strategic Projects, and Steven Murphy, Former Chief of the Nantucket Fire Department (NFD). During each visit, facility personnel were interviewed regarding historic and current operations of the fire suppression systems, type of firefighting foam used, locations of foam concentrate storage and potential use/release areas, and any records of foam discharges to the environment. Additionally, locations of historic plane crashes where firefighting foam was used were visited.

Background

All of the facilities inspected store Class B firefighting foam which is used to extinguish Class B materials such as gasoline, oil, and jet fuel. Class B Firefighting foams have recently become the subject of much scrutiny, as some formulations contain per- and poly- fluoroalkyl substances (PFAS). Many, but not all Class B foams contain PFAS and can generally be divided into two broad categories: fluorinated foams that contain PFAS usually referred to as Aqueous Film Forming Foam (AFFF), and fluorine-free foams that do not contain PFAS referred to as F3 foam.

PFAS are a group of man-made substances that were manufactured since the 1950s and have been used in a wide variety of consumer products and select firefighting foams. The PFAS serve as surfactants that spread the foam to trap oxygen and suppress the fire. Unfortunately, the same properties that make PFAS so effective in fighting fires make them very difficult to manage.

PFAS encompass a wide range of fluorinated carbon-chain compounds of differing carbon chain lengths, physical and toxicological properties, and environmental impacts. Due to their chains of carbon-fluorine bonds (the strongest in nature), these chemicals are very persistent in the environment and in the human body – meaning they do not break down and they can accumulate over time. There is evidence that exposure to some PFAS can lead to adverse human health effects.

PFAS are an emerging contaminant meaning they are not well researched and the regulatory framework regarding these compounds is evolving rapidly on both the state and federal level. In 2020, the Massachusetts legislature appointed the PFAS Interagency Task Force to develop a policy framework for addressing PFAS along their entire lifecycle. In August 2021, the Massachusetts Department of Environmental Protection (MassDEP) and Massachusetts Department of Fire Services issued Advisory Information for AFFF Containing PFAS (**Attachment 1**). In April 2022, the Task Force issued their final report that laid out a comprehensive set of recommendations, including a section dedicated to supporting firefighter and local fire departments (<https://malegislature.gov/Commissions/Detail/556/Documents>).

One of the recommendations of the report is to fund a second round of the AFFF Take-Back Program to collect and dispose of AFFF, clean up and decontaminate storage facilities and equipment exposed to AFFF, and purchase fluorine free foam for fire departments. MassDEP in collaboration with the Connecticut Department of Energy and Environmental Protection (CTDEEP) have recently conducted several efforts related to AFFF including conducting a study involving the analysis of six Class B foams currently on the market and listed as “fluorine-free” (led by MassDEP) and a field demonstration of methods to decontaminate foam dispensing equipment (led by CTDEEP).

Site Visits

The site visits confirmed current and/or historical use of a variety of PFAS-containing Class B foam including: AFFF, alcohol-resistant aqueous film forming foam (AR-AFFF), alcohol-resistant film forming fluoroprotein foam (AR-FFFP), and fluoroprotein foam (FP). One facility has already transitioned to a F3 foam and several others are planning to do so in the near future. It should be noted that all firefighting foams, even those that do not contain PFAS, should be evaluated and managed appropriately.

The purpose of the site visits was to document site activities and the operation of foam fire suppression systems for fire protection as well as identify measures that could be implemented to reduce the potential for an accidental activation of a fire suppression system or a spill of foam product.

The following summarizes the site visits, key information learned and recommendations for Best Management Practices (BMPs) for minimizing firefighting foam discharges to the environment. A comprehensive list of applicable BMPs is presented, though many of the BMPs listed are already

being implemented. A summary of the volume and type of firefighting foam stored at each facility¹, pertinent information regarding foam discharges, and recommended BMPs is provided in **Table 1 - Summary of Observations and Recommendations**. The facilities inspected as well as the approximate location of plane crash sites are shown on **Figure 1**. Photos of the facilities inspected are provided as **Photo Log 1**.

Nantucket Fire Department Facilities

Summary

Nantucket Fire Department (NFD) facilities located at 293 Madaket Road (Madaket Station), 131 Pleasant Street (former headquarters), 2 Fairgrounds Road, and 4 Fairgrounds Road (headquarters) were inspected. NFD maintains AFFF and AR-AFFF at the ready in the event of a Class B fire. Additionally, the Siasconset Fire House (Station 2) located at 10 West Santaky Road was also visited.

Currently, AFFF is carried on board a Rescue Truck stored at 4 Fairgrounds Road and AR-AFFF is carried on the foam attack trailer stored at 2 Fairgrounds Road. All additional foam concentrate is stored in a total of 58 containers ranging in size from 5-gallons to 55-gallons at the Madaket Road station. Reserve AFFF was historically stored at 131 Pleasant Street, 2 Fairgrounds Road, 4 Fairgrounds Road, and 10 West Sankaty Road, and was moved to Madaket Station in 2021.

According to NFD personnel, AFFF was sprayed on the following occasions:

- As a preventative measure following a fuel spill at the Downtown Tank Farm in 2004.
- During an emergency response to a fire at the town landfill in 2005.
- As part of the emergency response to two plane crashes in the Moors area of the Island (Middle Moors and Pout Pond) and one crash at the site of the former LORAN tower in Siasconset in the mid-2000s.
- During a Town training exercise conducted with the Nantucket Memorial Airport at the snow removal equipment (SRE) building located on Bunker Road on Airport property in 2015.
- Limited discharges may have occurred at 131 Pleasant Street as part of training exercises in the grassed area east of the building.

Recommended BMPs for Storage of AFFF Concentrate at NFD Facilities

NFD is planning to switch to a fluorine-free Class B foam. Prior to filling foam dispensing equipment with new foam, the apparatus must be emptied and decontaminated. There is currently no industry accepted standard for decontaminating equipment; however, multiple research projects are ongoing. The Department of Defense (DoD) Environmental Security Technology Certification Program (ESTCP) is funding a group of projects to demonstrate and validate environmentally

¹ Since the site visits, CDM Smith was informed that the Nantucket Harbor Master maintains two 5-gallon containers of AFFF, one on-board their vessel and one on the dock. This product will be replaced with F3 foam.

sustainable methods for cleaning firefighting delivery systems in aircraft hangars or on firefighting vehicles, as well as any rinsate or residue derived from the cleaning process.

Additionally, technologies for effective disposal of foam concentrate are not well understood. As stated in the interim PFAS destruction and disposal guidance (USEPA 2020)², one option for addressing disposal concerns related to environmental releases of foam, byproducts, or other possible releases is to store AFFF in warehouse storage to provide time for completion of studies for destruction, disposal, or stabilization of the AFFF. As detailed in USEPA's recently issued PFAS Strategic Roadmap³, updated guidance on destroying and disposing of certain PFAS and PFAS-containing materials is expected by Fall 2023.

Until industry recognized effective decontamination and disposal practices are identified, BMPs for storage of foam concentrate are recommended. These include:

- Educate and train staff in safety and environmental concerns related to firefighting foam.
- Maintain foam trailer to prevent potential for spills. The trailer was obtained through a Department of Homeland Security Grant and NFD is evaluating the return of the trailer through the same program. If the trailer is retained, regularly inspect the trailer for potential leaks of AFFF.
- Store concentrate containers at Madaket Station on secondary containment.
- Dispose of AFFF in accordance with state and federal regulations.
- Develop spill response and containment procedures for concentrate spills at NFD facilities.
- Engage a hazardous materials contractor capable of managing firefighting foam and foam concentrate if accidentally released at NFD facilities.
- In the case of spills at NFD, report discharges of PFAS-containing foam or concentrate in accordance with the Massachusetts Contingency Plan (MCP) 310 CMR 40.00.
- If necessary, perform site investigations and remediation in accordance with the MCP 310 CMR 40.00. NFD is not responsible for such MCP compliance when PFAS-containing foam is used in emergencies such as fires.
- Develop strategy for transitioning to F3 product.

² USEPA. 2020. PFAS Action Plan: Program Update February 2020. 100K20002. Washington, DC: U.S. Environmental Protection Agency.

³ USEPA. 2021. PFAS Strategic Roadmap: EPA's Commitments to Action 2021-2024. Washington, DC, U.S. Environmental Protection Agency. <https://www.epa.gov/pfas/pfas-strategic-roadmap-epas-commitments-action-2021-2024>.

Recommended BMPs if AFFF is Discharged in Response to a Fire

During an emergency response event, the first priority will always be the protection of life and property. However, there are BMPs that can be employed, when it is safe to do so, to reduce the extent of foam released to the environment. The following BMPs should be considered for managing firefighting foam in an emergency response scenario:

- AFFF should be contained and managed along with other hazardous materials generated during the emergency response outside of the hot zone as soon as possible and within the hot zone once the emergency has been mitigated.
- Properly decontaminate personal protective equipment (PPE) used during the emergency response.

Sun Island Fuel

Summary

Sun Island Fuel offers residential fuel oil, commercial diesel for equipment, and marine diesel to residential and commercial properties on Nantucket. The property, located at 5 Sun Island Road, is approximately 7 acres in size with commercial space, maintenance garages, and fuel storage. The fuel storage facility is comprised of four (4) 10,000-gallon polyethylene #2 fuel oil tanks and one (1) 10,000-gallon polyethylene diesel tank. Secondary containment is provided by a concrete base with an approximately 12-inch high bermed perimeter. The containment area is pitched to a catch basin which drains to a wet well and oil/water separator, and discharges to a leachfield on the northeast portion of the site.

The fuel farm was historically protected by a foam fire suppression system comprised of a 600-gallon concentrate tank and nozzles for external protection of the tanks. The system utilized AFFF and two (2) 55-gallon drums of concentrate were stored in the trailer that houses the mechanical components of the system.

According to Sun Island personnel, the fire suppression system was activated during commissioning in 1994. Discharged foam was not contained and would have ultimately drained to the leachfield. No spills or accidental discharges were reported.

In September 2021, Sun Island isolated the foam portion of the fire suppression system and is operating with water only for fire protection. Sun Island is developing a strategy for removing foam components and replacing/decontaminating piping.

On April 27, 2022, the MassDEP issued a Notice of Responsibility (NOR) citing the 1994 discharge of foam during system commissioning.

Recommended BMPs

The fire suppression system is currently operating as a water only system; however, the foam piping and concentrate tank remain and potential for a foam discharge exists. Until the foam portion of the fire suppression system is fully decommissioned, the following BMPs are recommended:

- Educate and train staff in safety and environmental concerns related to firefighting foam.
- Store all AFFF product in a foam system trailer on secondary containment. Develop spill response and containment procedures for concentrate spills and foam discharges.
- Engage a hazardous materials contractor capable of managing firefighting foam and PFAS-impacted materials.
- Report discharges of PFAS-containing foam or concentrate in accordance with the MCP 310 CMR 40.00.
- If necessary, perform site investigation and remediation in accordance with the MCP 310CMR 40.00.

During modification/construction of a water-only system, the following BMPs should be considered:

- Decontaminate or dispose of foam dispensing equipment and piping in accordance with state and federal regulations.
- Dispose of AFFF in accordance with state and federal regulations.

Madaket Marine

Summary

Madaket Marine is a waterfront marina in the Madaket portion of the Island providing dockage, moorings, fuel, and general marine services. Located at 20 North Cambridge Street, the property is approximately 17-acres with about 7 acres improved with two large garages, including administrative and retail space, and multi-level boat storage.

Madaket marine maintains a mobile, hand operated foam unit supplied by a 15-gallon foam concentrate container for fire suppression in the event of a fuel fire. AR-AFFF was previously utilized until 2020 when Madaket Marine switched to a F3 product. One (1) 15-gallon container of F3 is stored in the garage.

According to Madaket Marine personnel, AR-AFFF was discharged once to Madaket Harbor during a spill response drill with the U.S. Coast Guard and NFD in 2011. No spills or accidental discharges were reported.

Recommended BMPs

The following BMPs are recommended:

- Educate and train staff in safety and environmental concerns related to firefighting foam.
- Store F3 product in garage on secondary containment.
- Develop spill response procedures for spills of concentrate or discharges of foam.
- Engage a hazardous waste contractor capable of managing firefighting foam.

Downtown Fuel Farm

Summary

The Island Energy Services Downtown Fuel Farm is an approximately 0.4 acre parcel developed in the 1960s with eleven (11) above ground storage tanks for storage of diesel fuel, ethanol, kerosene, No. 2 fuel oil, and gasoline. Plans to relocate the Downtown Fuel Farm from 9 Salem Street have been underway for several years and in 2019, six (6) new tanks were constructed at the new Fuel Farm located at 11 Industry Road. The new Fuel Farm utilizes a F3 foam and was not inspected as part of this site visit.

Of the eleven (11) tanks, nine (9) are being removed and two (2) will be replaced with smaller tanks to serve the nearby Nantucket Boat Basin. As of September 2021, the nine (9) tanks had been emptied, cleaned, and planned for demolition. Two (2) tanks consisting of gasoline and diesel will remain until they are replaced with smaller tanks in the future. The tanks are surrounded by a 6-foot-high concrete dike wall providing vertical containment. The tanks were constructed directly on the ground surface and no additional horizontal containment is provided below the tanks. The fuel loading rack is located along the southwestern wall of the tank farm.

The tanks and fuel loading rack are protected by a foam fire suppression system comprised of a 200-gallon concentrate tank and nozzles for external protection of each tank and eight (8) foam nozzles at the fuel loading rack. The system currently utilizes AR-AFFF and four (4) 55-gallon drums and three (3) 5-gallon containers of concentrate are stored in the shed that houses the mechanical components of the system.

The fuel loading rack portion of the fire suppression system is activated via four optical flame detectors. Two emergency pull switches alarm only and do not activate the foam system. The tank farm portion of the fire suppression system is activated manually at an external control panel located at the rear of the adjacent Stop and Shop grocery store. The system is shut down by shutting off the water source valve in the system shed.

In 2004, AR-AFFF from the fire suppression system and additional AFFF applied by NFD were used to manage a fuel spill within the tank farm. A foam blanket was created above the surface of the fuel to reduce the potential for ignition. Accidental activations of the foam system at the fuel loading rack have been reported.

From the 1970s to 2017, bi-annual testing of the foam system at two tanks per testing session was performed. Discharged foam was not recovered. Since 2017, bi-annual testing has been performed with water only.

Recommended BMPs

As part of the tank demolition activities, foam fire suppression piping to the tanks that have been taken out of service have been cut and capped. The foam fire suppression system will remain in use for the two (2) tanks serving the Boat Basin until the tanks are replaced. The new tanks will not be protected with a fire suppression system. While the current system remains in use, the following BMPs are recommended:

- Educate and train staff in safety and environmental concerns related to firefighting foam.
- Store all AR-AFFF product in foam system shed on secondary containment.
- Train staff in fire suppression system emergency activation and shut-down procedures in collaboration with NFD.
- Develop spill response and containment procedures for concentrate spills and foam discharges.
- Engage a hazardous materials contractor capable of managing firefighting foam and PFAS-impacted materials.
- Report discharges of PFAS-containing foam or concentrate in accordance with the MCP 310 CMR 40.00.
- If necessary, perform site investigation and remediation in accordance with the MCP 310 CMR 40.00.

During tank demolition activities, the following BMPs should be considered:

- Decontaminate or dispose of foam dispensing equipment and piping or other materials that may have been impacted by PFAS in accordance with state and federal regulations.

Nantucket Boat Basin

Summary

The Nantucket Boat Basin (Boat Basin) is a marina located on Swains Wharf (1 Swains Wharf Road) providing dockage and marine fuel. The facility is operated by White Elephant and NE Development. The approximately 0.5-acre parcel is located entirely on the wharf and is improved with an administrative building, foam system shed, and several ancillary buildings. A fuel distribution system carries marine gasoline from the Downtown Fuel Farm to the fuel pumps on the dock.

The dock is equipped with a foam fire suppression system comprised of 500-gallon AFFF concentrate tank and nine (9) foam nozzles installed at approximately 10-foot spacing along the

edge of the dock. The system is activated via emergency pull switches at each foam nozzle which alarm and initiate the discharge of foam. The system can be turned off at the emergency pull switch or at the valve in the foam shed.

Three (3) 55-gallon drums of AFFF are stored in the foam shed, and one (1) 55-gallon drum was observed in a small, covered barn with dirt floor and catch basin.

From the mid-1990s to early 2000s, AFFF was discharged to Nantucket Harbor as part of annual testing. Testing is currently performed with water only. One accidental discharge was reported by Boat Basin personnel. This occurred approximately 25 years ago when a foam pull switch was inadvertently activated.

Recommended BMPs

According to Boat Basin personnel, the fire suppression system is planned for modification to a F3 system. The following BMPs are recommended for both AFFF and F3 systems:

- Educate and train staff in safety and environmental concerns related to firefighting foam.
- Store all firefighting foam product in foam system trailer on secondary containment.
- Train staff in fire suppression system emergency activation and shut-down procedures in collaboration with NFD.
- Develop spill response and containment procedures for concentrate spills and foam discharges.
- Engage a hazardous materials contractor capable of managing firefighting foam and PFAS-impacted materials.
- Report discharges of PFAS-containing foam or concentrate in accordance with the MCP 310 CMR 40.00.
- If necessary, perform site investigation and remediation in accordance with the MCP 310 CMR 40.00.
- Develop strategy for transitioning to F3 product.

Summary and Recommendations

Inspections of Town of Nantucket Fire Department facilities and private fuel storage facilities demonstrated that the operators of the facilities have a sound understanding of the operation of their firefighting foam dispensing systems and the potential environmental impacts of a firefighting foam discharge. The BMPs presented in this memo are intended to reduce the potential for future releases of firefighting foam to the environment and are suitable for both AFFF and F3 formulations. These BMPs have been presented for the Town's review and consideration and may require modification, elimination, or inclusion of additional measures based on the Town's understanding of facility-specific operations. NFD and the facility operators communicate regularly and are already

implementing many of the BMPs recommended in this memo; however, the Town may wish to formalize these practices.

BMPs are typically implemented through a variety of methods such as:

- Activity-specific BMP Fact Sheets or Standard Operating Procedures (SOPs). For example, Fact Sheets could be prepared for activities such as Foam Concentrate Storage and Handling, Spill Reporting, Foam Fire Suppression Testing, Foam Fire Suppression System Decontamination, and/or Firefighting Foam Discharge Emergency Response. These Fact Sheets would then be distributed to the fuel storage facilities.
- Training. Training is a critical component to any BMP program. Because PFAS is an emerging contaminant, many site personnel may not be aware of its presence in AFFF or of the health and safety and environmental concerns related to firefighting foam in general.
- Inspections. Inspection of BMPs are performed to ensure that the preventative measure is performing as intended. A good way to facilitate inspections is generation of a site-specific inspection form to be used on a regular basis (e.g. monthly, quarterly) to document that BMPs are in place and note any corrective actions needed.
- BMP Tracking and Record Keeping. Documentation of BMP implementation through record keeping is critically important in a successful mitigation program. BMP records should be accurate, clear, and well-organized.

Given the significant investment the Town has made in performing the island-wide assessment of PFAS and the significant interest in achieving source control and/or reductions, CDM Smith also recommends the following actions:

1. Develop written BMPs and SOPs for the NFD based on the recommendations presented in Table 1 for management of firefighting foam at Town facilities as well as in response to any release of firefighting foam island-wide. Train NFD staff on health and safety concerns related to the use of firefighting foam and environmental concerns. Perform regular inspections and maintain records of firefighting foam inventories, training, inspections, and other relevant documentation.
2. Consider facilitating a BMP program with private fuel storage entities to reinforce consistent implementation of the mitigation measures. The Town could provide guidance on the details of the program allowing each entity to implement the components individually, or the Town/NFD could prepare materials, provide training, and perform inspections of the facilities.
3. Prior to switching to a F3 product, foam dispensing equipment must be emptied and decontaminated. Because PFAS surfactants in AFFF coat the walls of storage tanks and associated plumbing within foam systems on board fire trucks, cleaning is needed to remove

AFFF from these surfaces. While several commercial vendors offer decontamination services, **there is currently no industry accepted standard for effectively decontaminating foam dispensing equipment.** Importantly, federal guidance on best management practices for cleaning municipal fire apparatus that previously contained AFFF and minimum PFAS clean up levels is not yet available.

The Connecticut DEEP in collaboration with MassDEP, recently performed a field decontamination demonstration project to evaluate the feasibility and effectiveness of two cleaning agents in removing residual PFAS from fire apparatus, including the state's eight regional foam trailers. CTDEEP's conclusions of the demonstration suggest that the use of proprietary agents was slightly more effective in removing PFAS than plain water; however, residual PFAS levels remain following the use of propriety cleaning agents that will still cross-contaminate new fluorine-free foam. Additionally, the use of cleaning agents presents significant logistics and cost.

Residual PFAS remaining in fire apparatus, even after rinsing with water or cleaning agents, can cross-contaminate the new foam. Deployment of the new foam may still pose a potential environmental and/or human health risk. Based on the results of CTDEEP's field decontamination demonstration project, CTDEEP in cooperation with the CT State Commission on Fire Prevention & Control, developed guidance on draining and rinsing of AFFF from municipal fire apparatus onboard foam systems (**Attachment 2**). This guidance is voluntary and developed to help prevent the accidental discharge of foam containing PFAS into the environment.

A cost-benefit analysis relative to risk reduction and NFD's overall goals for fire protection and environmental compliance should be performed as part of NFD's development of a foam transition strategy.

4. Most AFFF concentrate has historically been disposed of using incineration; however, the effectiveness of incineration, and the temperature and time conditions required to achieve complete PFAS destruction, are not well understood. Legal, technical, and political challenges to incinerating AFFF exist based on gaps in research on the effectiveness of incineration. Additional methods currently being used for disposal of AFFF concentrate include underground injection wells, hazardous waste landfills, and solid waste landfills (ITRC 2021)⁴. The Town should evaluate the relative risks of continuing to store AFFF onsite against those of shipping concentrate to a licensed hazardous waste disposal facility.

⁴ <https://pfas-1.itrcweb.org/wp-content/uploads/2021/08/PFAS-Guidance-Doc-Full.pdf>

Chuck Larson, Manager of Strategic Projects, Town of Nantucket

September 30, 2022

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cc: Sean Mitchell, Deputy Fire Chief, Nantucket
Gregg Tivnan, Assistant Town Manager, Nantucket
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Andrew Miller, P.E., CDM Smith

Attachments:

Figure 1- Firefighting Foam Storage and Known Release Areas

Table 1- Summary of Observations and Recommendations - Firefighting Foam Inventory

Photo Log 1- Facility Photos

Attachment 1 - Advisory Information for AFFF Containing PFAS, MassDEP, August 2021

Attachment 2 - State of Connecticut AFFF Take-Back Program Draining and Rinsing AFFF from Municipal Onboard Systems, CT DEEP, May 2022

Nantucket Town-wide PFAS Risk Assessment Nantucket, Massachusetts



Figure 1
Firefighting Foam Storage and Known Release Areas

Legend

Potential Sources

- Known AFFF Discharge Location (approximate)
- AFFF or F3 Storage Location
- Nantucket Memorial Airport
- Airport Property

Potential Receivers/Handlers

- ◆ WWTF
- Inactive Landfill - Siasconset Dumps 1 and 2
- Madaket Road Solid Waste Management (Landfill and Co-Compost Facility)

Potential Receptors

- Municipal Water Supply Well
- Private Public Water Supply Well
- MassDEP Approved Zone II

Island Infrastructure

- Road Centerline



0 2,800 5,600 11,200

Feet

1" = 5,600'

Updated:
December 21, 2021



- **AFFF or F3 Storage Location**
 - #1: Nantucket Fire Dept. - 2 & 4 Fairgrounds Road
 - #2: Nantucket Fire Dept. - 293 Madaket Road
 - #3: Nantucket Memorial Airport Air Rescue and Fire Fighting (ARFF) Facility
 - #4: Downtown Tank Farm
 - #5: Boat Basin
 - #6: Madaket Marine
 - #7: Sun Island Fuel Farm
 - #8: Fuel Farm on Industry Road
 - #9: Nantucket Fire Dept. - 10 W. Sankaty Road
- **Known AFFF Discharge Location (approximate)**
 - A: Nantucket Memorial Airport (multiple locations)
 - B: Nantucket Landfill
 - C: Downtown Tank Farm
 - D: Low Beach Road/LORAN Tower Plane Crashes
 - E: Sun Island Fuel Farm
 - F: Nantucket Fire Dept. - 131 Pleasant Street
 - G: Moors Plane Crashes
 - H: Boat Basin

Disclaimer: The GIS data presented on this map is believed to be current as of 2020. Any recent updates and/or expansion to the water and sewer systems may not be reflected in this information. It is recommended that the Nantucket Water Company, Nantucket Sewer Department and/or Town Board of Health be contacted to verify any information for project-level planning or design.

The map is for reference only and is not a legal document. CDM Smith, the Town and County of Nantucket, MA makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented in this map. The scale is approximate. Critical layout or measurement activities should not be done using this resource.



Nantucket Solid Waste Management Site (Nantucket Landfill and Co-Compost Facility)

Long Pond

Hummock Pond

Miacomet Pond

Surfside WWTF and Infiltration Beds

Siasconset WWTF and Infiltration Beds

Well 14

Well 12

Well 16

Well 15

Well 13

Well 12

Well 12

Well 15

Well 13

Well 14

Well 12

Well 16

Well 15

Well 13

Well 14

Well 12

Well 16

Well 15

Well 13

Well 14

Well 12

Well 16

Well 15

Well 13

Well 14

Well 12

Well 16

Well 15

Well 13

Table 1
Summary of Observations and Recommendations - Firefighting Foam Inventory
Town of Nantucket
Nantucket, Massachusetts

Operator	Location	Current Foam Storage				Historic Foam Usage/Storage	Facility Description	Release History	Recommended BMPs
		Type	Product	Quantity	Size				
Nantucket Fire Department	293 Madaket Rd (Madaket Station)	AFFF	National Foam Aer-O-Water 3%	10	55-gallon drums	None	<ul style="list-style-type: none"> Facility is very small barn with one bay door. Apron is concrete and drains to Madaket Rd. No catch basins were observed. Currently used for storage of AFFF only. Building does not contain any floor drains. Surrounding area is grassed with no catch basins in the area. 	<ul style="list-style-type: none"> No known releases. 	<ul style="list-style-type: none"> Educate and train staff in safety and environmental concerns related to firefighting foam. Store all AFFF product in barn on secondary containment. Dispose of AFFF in accordance with state and federal regulations. Develop spill response procedures for spills of concentrate or discharges of foam. Contract with hazardous waste contractor capable of managing firefighting foam and PFAS-containing materials. Report spills and perform site investigations and remediation in accordance with 310 CMR 40.00.
		AR-AFFF	National Foam Universal Gold 1%/3%	10	55-gallon drums				
		AFFF	Edelweiss Vulcan 3%	32	5-gallon containers				
		AFFF	National Foam Aer-O-Water 3%	4	5-gallon containers				
		AR-FFFP	ANGUS 3/3 ALCOSEAL	2	5-gallon containers				
	131 Pleasant St (Former Headquarters)	None currently stored				Four (4), 55-gallon drums and five (5), 5-gallon containers moved to 2 Fairgrounds Rd in 2016.	<ul style="list-style-type: none"> Building contains three apparatus bays with three bay doors on the front and rear of the building. Floor drains in building drain to oil/water separator to sanitary sewer. Aprons outside bays are paved with no catch basins observed. Remainder of property is grassed. 	<ul style="list-style-type: none"> Limited discharges as part of training may have occurred in grassed area to east of building. 	<ul style="list-style-type: none"> No BMPs applicable as no AFFF storage currently
	2 Fairgrounds Rd	AR-AFFF	National Foam Universal Gold 1%/3%	1	Foam attack trailer with 500-gallon on-board tank	Four (4), 55-gallon drums and five (5), 5-gallon containers moved to Madaket Station in 2021.	<ul style="list-style-type: none"> Building is former maintenance facility now used for records storage and housing of foam attack trailer. 	<ul style="list-style-type: none"> No known releases. 	<ul style="list-style-type: none"> Educate and train staff in safety and environmental concerns related to firefighting foam. Maintain foam trailer to prevent potential for spills. Evaluate return of equipment. Develop spill response procedures for spills of concentrate or discharges of foam. Contract with hazardous waste contractor capable of managing firefighting foam and PFAS-containing materials. Report spills and perform site investigations and remediation in accordance with 310 CMR 40.00.
	4 Fairgrounds Rd (Headquarters)	AFFF	Edelweiss Vulcan 3%	1	Rescue Truck with 20-gallon on-board tank	Three (3), 15-gallon containers of AFFF were previously stored and moved to Madaket Station in 2021.	<ul style="list-style-type: none"> Building contains three apparatus bays with six bay doors on the front and rear of the building. Floor drains in building drain to oil/water separator to sanitary sewer. Aprons outside bays are paved. Two stormwater catch basins were observed along the perimeter of the apron in the front of the building along Fairgrounds Road. Remainder of property is paved. 	<ul style="list-style-type: none"> One discharge event occurred in 2015 as part of training at SRE building located on Bunker Road on ACK property. 	<ul style="list-style-type: none"> Educate and train staff in safety and environmental concerns related to firefighting foam. Develop strategy for transitioning to F3 product. Develop spill response procedures for spills of concentrate or discharges of foam. Contract with hazardous waste contractor capable of managing firefighting foam and PFAS-containing materials. Report spills and perform site investigations and remediation in accordance with 310 CMR 40.00.
				2	5-gallon containers stored on Rescue Truck				
	10 West Sankaty Road (Siasconset Fire Department, Station 2)	None currently stored				Two (2) 5-gallon containers of AFFF historically stored here, moved to 2 Fairgrounds Rd in 2016.	<ul style="list-style-type: none"> Facility is former schoolhouse, converted to garage with one bay door. Apron and garage is concrete, apron drains towards West Sankaty Road. No catch basins were observed. 	<ul style="list-style-type: none"> No known releases. 	<ul style="list-style-type: none"> No BMPs applicable as no AFFF storage currently

Table 1
Summary of Observations and Recommendations - Firefighting Foam Inventory
Town of Nantucket
Nantucket, Massachusetts

Operator	Location	Current Foam Storage				Historic Foam Usage/Storage	Facility Description	Release History	Recommended BMPs
		Type	Product	Quantity	Size				
Sun Island Fuel	Sun Island Fuel 5 Sun Island Rd	FP	National Foam Aer-O-Foam XL-3 3%	1	600-gallon tank	Same product has been used since facility construction in 1994.	<ul style="list-style-type: none"> Facility consists of four (4) 10,000-gallon poly #2 fuel oil tanks and one (1) 10,000-gallon poly diesel tank. Tanks were historically protected by foam fire suppression system comprised of 600-gallon concentrate tank and nozzles for external protection of tanks. The foam portion of the system has been turned and fire protection is currently provided by water only. Secondary containment is provided by concrete, bermed structure which drains to leachfield via wet well with oil/water separator. Two drums of AFFF stored in foam trailer. System is activated via two optical flame detector cameras or manual emergency pull station. System is shut down by shutting off water source valve. 	<ul style="list-style-type: none"> Fire suppression system was activated during system commissioning in 1994 and foam/water discharged to leachfield. 	<ul style="list-style-type: none"> Educate and train staff in safety and environmental concerns related to firefighting foam. Store all AFFF product in foam system trailer on secondary containment. Develop spill response and containment procedures for concentrate spills and foam discharges. Engage a hazardous materials contractor capable of managing firefighting foam and PFAS-impacted materials. Report discharges of PFAS-containing foam or concentrate in accordance with the Massachusetts Contingency Plan (MCP) 310 CMR 40.00. Perform site investigations and remediation in accordance with the MCP 310 CMR 40.00. Decontaminate or dispose of foam dispensing equipment and piping in accordance with state and federal regulations. Dispose of AFFF in accordance with state and federal regulations.
				2	55-gallon drums				
Madaket Marine	Madaket Marine 20 N Cambridge St	F3	National Foam Universal Green	1	15-gallon container	Switched from AR-AFFF to F3 in 2020.	<ul style="list-style-type: none"> Facility is a waterfront marina improved with two large garages, including administrative and retail space, dockage and moorings. Foam fire suppression is provided by a mobile, hand operated foam unit supplied by a 15-gallon foam concentrate container. One (1) container of F3 is stored in garage. 	<ul style="list-style-type: none"> Foam discharged to ocean as part of spill drill conducted with Nantucket Fire Department and Coast Guard in 2000. 	<ul style="list-style-type: none"> Educate and train staff in safety and environmental concerns related to firefighting foam. Store F3 product in garage on secondary containment. Develop spill response procedures for spills of concentrate or discharges of foam. Contract with hazardous waste contractor capable of managing firefighting foam.
		F3	National Foam Universal Green	1	Mobile foam unit with 15-gallon container				
Island Energy Services	Downtown Fuel Farm	AR-AFFF	National Foam Universal Gold 1%/3%	1	200-gallon tank	Same product has been used since facility construction in 1960s.	<ul style="list-style-type: none"> Facility has historically consisted of eleven (11) above ground storage tanks for storage of diesel fuel, ethanol, kerosene, No. 2 fuel oil, and gasoline. As of September 2021, nine (9) tanks had been emptied, cleaned and planned for demolition. Two (2) tanks consisting of gasoline and diesel will remain. Tanks are surrounded by 6-foot high concrete dike wall. The tanks are set directly on the ground surface. No additional containment is provided below the tanks. Tanks and fuel loading rack are protected by foam fire suppression system comprised of 200-gallon concentrate tank and nozzles for external protection of each tank and eight (8) foam nozzles at loading rack. Adjacent Stop and Shop grocery store is protected by water-only sprinkler system. Fuel loading rack portion of fire suppression system is activated via four optical flame detectors. Two emergency pull switches alarm only. System is turned off at valve in foam shed. Tank farm portion of fire suppression system is activated manually at external control panel at rear of Stop and Shop. 	<ul style="list-style-type: none"> In 2004 AR-AFFF was used to manage a fuel spill within the tank farm. A foam blanket was created to reduce the potential for ignition. Accidental activations at fuel loading rack have been reported. Bi-annual testing of foam system occurred from 1970s to 2017. Since 2017, bi-annual testing has been performed with water only. 	<ul style="list-style-type: none"> Educate and train staff in safety and environmental concerns related to firefighting foam. Store all AR-AFFF product in foam system shed on secondary containment. Train staff in fire suppression system emergency activation and shut down procedures in collaboration with NFD. Develop spill response and containment procedures for concentrate spills and foam discharges. Engage a hazardous materials contractor capable of managing firefighting foam and PFAS-impacted materials. Report discharges of PFAS-containing foam or concentrate in accordance with the Massachusetts Contingency Plan (MCP) 310 CMR 40.00. Perform site investigations and remediation in accordance with the MCP 310 CMR 40.00. Decontaminate or dispose of foam dispensing equipment and piping or other materials that may have been impacted by PFAS in accordance with state and federal regulations.
				4	55-gallon drums				
				3	5-gallon containers				

Table 1
Summary of Observations and Recommendations - Firefighting Foam Inventory
 Town of Nantucket
 Nantucket, Massachusetts

Operator	Location	Current Foam Storage				Historic Foam Usage/Storage	Facility Description	Release History	Recommended BMPs
		Type	Product	Quantity	Size				
White Elephant/ NE Development	Nantucket Boat Basin 1 Swains Wharf Rd	AFFF	National Foam Aer-O-Lite Cold Foam 3%	1	500-gallon tank	Switched from FP to AFFF in mid-2000s.	<ul style="list-style-type: none"> Facility consists of dock and fuel distribution system for marine gasoline from Downtown Fuel Farm. Dock is equipped with foam fire suppression system comprised of 500-gallon concentrate tank and nine (9) foam nozzles installed at approximately 10-foot spacing along the edge of the dock. Three (3) drums of AFFF stored in foam shed, one (1) stored in covered barn with dirt floor and catch basin. System is activated/shut down via pull switches at each foam nozzle. System is turned off at valve in foam shed. 	<ul style="list-style-type: none"> From mid-1990s to early 2000s discharged foam as part of annual testing. Current testing performed with water only. One accidental discharge was reported by Boat Basin personnel, approximately 25 years ago when a foam pull switch was inadvertently activated. 	<ul style="list-style-type: none"> Educate and train staff in safety and environmental concerns related to firefighting foam. Store all firefighting foam product in foam system trailer on secondary containment. Train staff in fire suppression system emergency activation and shut down procedures in collaboration with NFD. Develop spill response and containment procedures for concentrate spills and foam discharges. Engage a hazardous materials contractor capable of managing firefighting foam and PFAS-impacted materials. Report discharges of PFAS-containing foam or concentrate in accordance with the Massachusetts Contingency Plan (MCP) 310 CMR 40.00. Perform site investigations and remediation in accordance with the MCP 310 CMR 40.00. Develop strategy for transitioning to F3 product.
				4	55-gallon drums				

Notes

AFFF: Aqueous film forming foam
 AR-AFFF: Alcohol-resistant aqueous film forming foam
 AR-FFFP: Alcohol-resistant film forming fluoroprotein foam
 BMPs: Best Management Practices
 FP: Fluoroprotein Foam
 F3: Fluorine Free Foam

Attachment 1

Photo Log – Nantucket Firefighting Foam Storage Locations

September 14 and 15, 2021

Nantucket Fire Department – 293 Madaket Road (Madaket Station)



Aerial view



Storage barn – Madaket Fire House



Drums stored along western wall of storage barn



Drums stored along eastern wall of storage barn

Nantucket Fire Department – 131 Pleasant Street (former Headquarters)



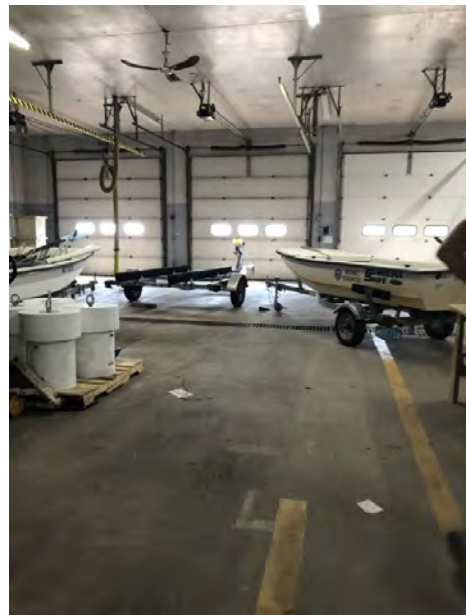
Aerial view



Sparks Avenue entrance

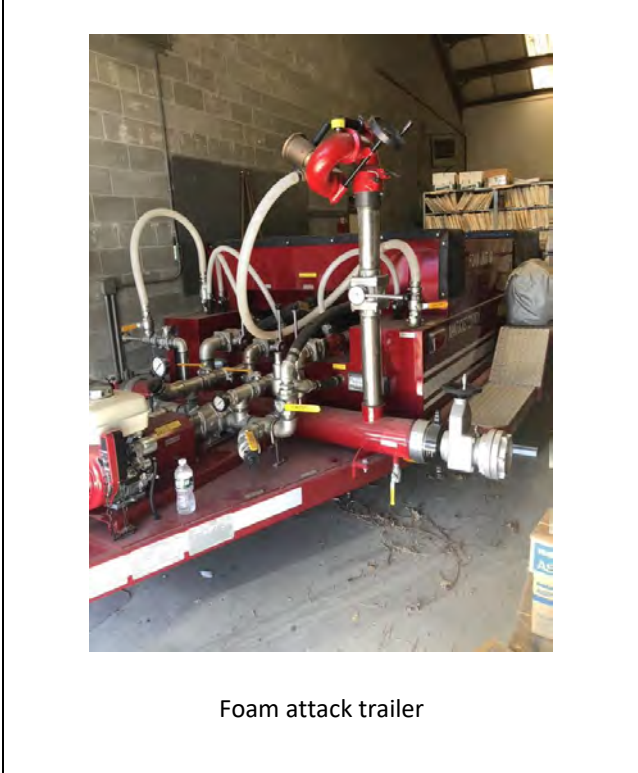
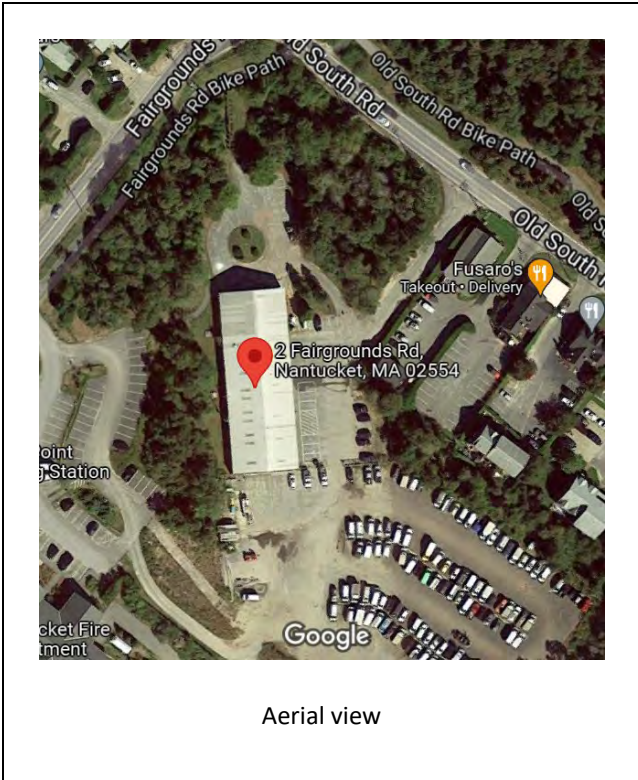


Pleasant Street entrance



Interior of building (no AFFF stored at this facility)

Nantucket Fire Department – 2 Fairgrounds Road



Nantucket Fire Department – 4 Fairgrounds Road (Headquarters)



Aerial view



Front of building



Rescue truck with AFFF



AFFF concentrate tank on rescue truck

Nantucket Fire Department – 10 West Sankaty Road (Siasconset Fire Station, Station 2)



Aerial view



Exterior of building – Siasconset Fire



Open bay door, fire truck in garage

Sun Island Fuel – 5 Sun Island Road



Aerial view



600-gallon foam concentrate tank and drums of AFFF

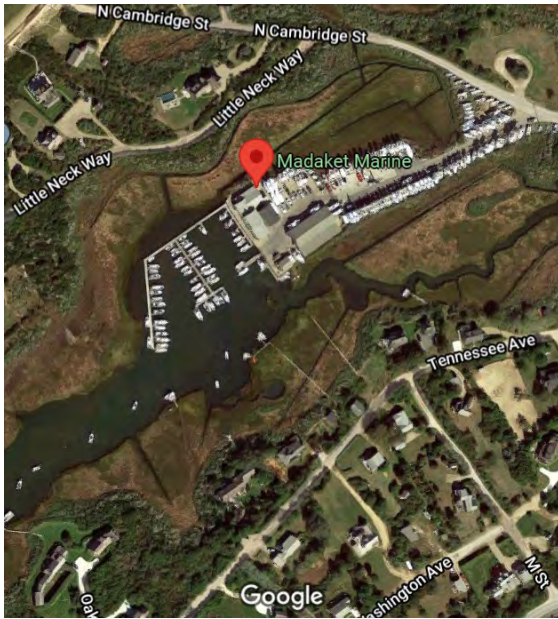


Foam system emergency activation pull station



Fuel storage tanks and fire suppression system

Madaket Marine – 20 North Cambridge Street



Aerial view



Mobile foam unit



Catch basin outside of garage



Location of spill response drill

Downtown Fuel Farm – 9 Salem Street



Aerial view



Fuel loading rack

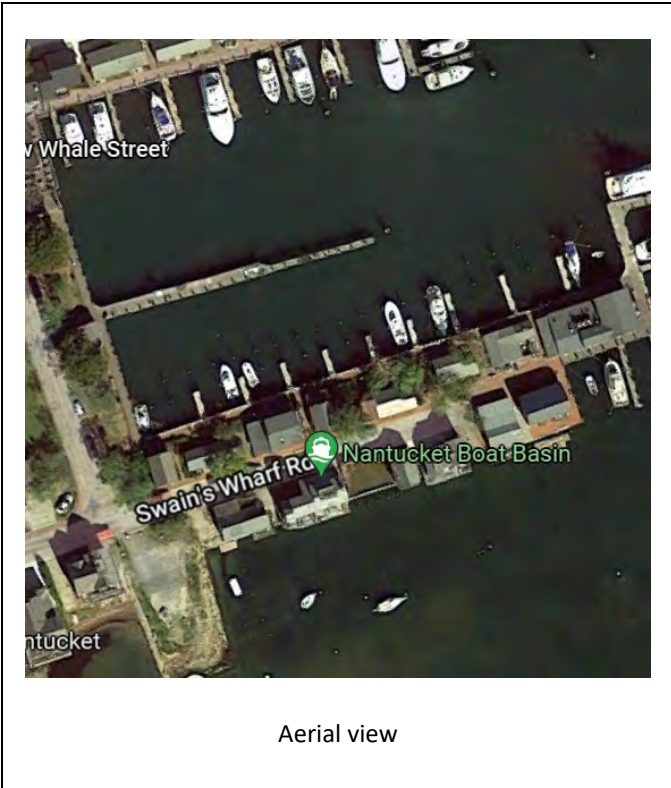


Foam concentrate tank

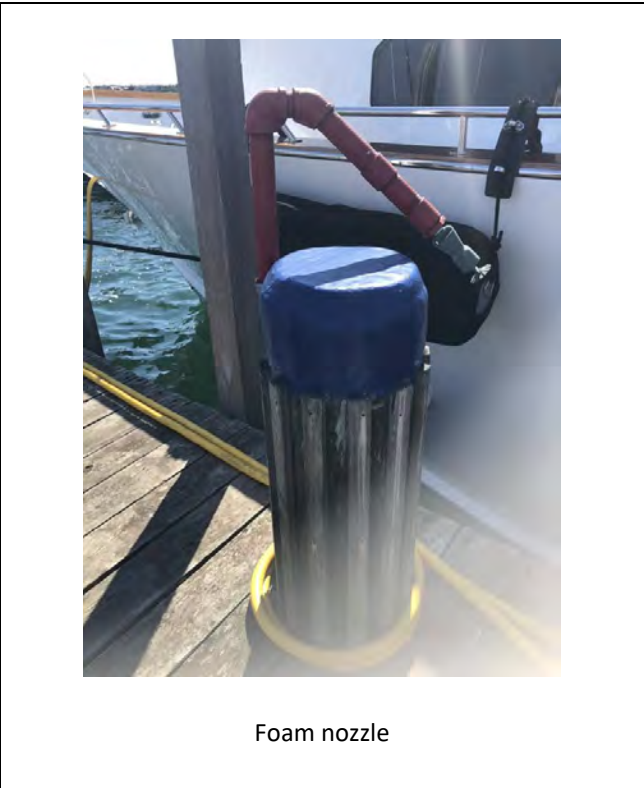


Fire suppression system piping

Boat Basin - 1 Swains Wharf Rd



Aerial view



Foam nozzle



Foam activation/shut down pull switch



AFFF concentrate tank



Advisory Information for Aqueous Film Forming Foam (AFFF) Containing Per- and Polyfluorinated Alkyl Substances (PFAS) August 2021

Massachusetts Department of Environmental Protection
Massachusetts Department of Fire Services

Brief

The use of firefighting Aqueous Film Forming Foams (AFFF) containing Poly Fluorinated Alkyl Substances (PFAS) are effective for “class B” fire suppression, but also pose health and environmental concerns. The Massachusetts Department of Fire Services and Department of Environmental Protection, in coordination with our partners in Connecticut, are advising fire departments to immediately cease using AFFF older than 2003 and reserve the use of current (post-2003) AFFF only when life safety is at risk. New AFFF “Fluorine Free Foams (3F)” are available and can be used without restriction.

Background

Per- and Polyfluorinated Alkyl Substances, commonly known as “PFAS”, are a family of chemicals with a similar structure, numbering in the thousands. The chemicals are known for their strong carbon-fluorine bonds, and they vary by the length and structure of a carbon-chain backbone and a terminal functional group. These compounds are very stable and impart resistance from water, oil, grease, dirt, and heat to items on which they are applied. They have wide-ranging applications, such as in grease-resistant microwave popcorn bags and pizza boxes, waterproof clothing and boots, carpets that resist stains, pipes and wires that resist corrosion, and certain firefighting foams.

Recent toxicological studies have indicated there is a health concern when people are exposed to PFAS, even to low concentrations. Because of their stability, PFAS do not readily break down in the environment or in the human body. Possible health effects associated with exposure to PFAS compounds include low infant birth weights, effects on the immune system, cancer, and thyroid hormone disruption (Ross, R.). Concerns about PFAS have focused on what are called “long-chain” versions of these compounds, typically compounds with six or more carbon atoms linked together in a chain. Two of the most studied PFAS are eight-carbon chain versions, perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). As of 2015, neither PFOA nor PFOS are manufactured in the U.S., having been voluntarily phased-out of production starting in 2006. However, other PFAS, including “short-chain,” have been developed as replacements for PFOA and PFOS in manufacturing, and these replacement compounds are less well studied.

The Massachusetts Department of Environmental Protection (MassDEP) has established a drinking water standard¹ of 20 ng/L (parts-per-trillion, or “ppt”) for the total of six PFAS chemicals – perfluorohexane sulfonate (PFHxS), perfluoroheptanoic acid (PFHpA), PFOA, PFOS, perfluorononanoic acid (PFNA), and perfluorodecanoic acid (PFDA). In addition, MassDEP has established Reportable Concentrations (RCs) and cleanup standards in soil and groundwater for the same six PFAS compounds.²

PFAS and Firefighting Foam

Firefighting foam can be broken down into two main categories: Class A and Class B.

¹ Massachusetts Maximum Contamination Level (MMCL), 310 CMR 22.00

² Massachusetts Contingency Plan, 310 CMR 40.0000

Class A foams do not contain PFAS and are safe to use for their intended purpose. They are covered under NFPA 1150 (Standard on Foam Chemicals for Fires in Class A Fuels). The intended purpose is to reduce the surface tension of the water to allow for more water to burning material surface contact, which allows for faster fire extinguishment. There are no restrictions on the use of Class A foams.

Class B foams often contain PFAS, in addition to other chemical precursors. These different types of foams can be divided into numerous tactical categories with respect to expansion rates (low, medium, and high) and compatibility with different types of fuel (polar and non-polar flammable liquids). ***Importantly, all Aqueous Film Forming Foam (AFFF) products contain PFAS*** (ITRC 2018). This guidance document is focused on PFAS-containing AFFF, Alcohol Resistant AFFF (AR-AFFF), and fluoro-protein foam; the foam's potential to be a hazard to responders who use the foam; and its ability to create an adverse environmental impact if released uncontrolled to the environment. This is particularly the case if the PFAS foam solutions reach drinking water sources, groundwater, or surface waters. With regard to health and environmental concerns, the Class B foams are broken down into four categories:

- **Legacy PFOS Foams**, which contain long-carbon-chain fluorinated compounds (C8), specifically PFOS and PFOA, manufactured prior to 2003 by 3M and sold under the brand name "Lightwater" (ITRC 2018).
- **Legacy Fluorotelomer Foams** (contain some long-chain PFAS) manufactured from the 1970s until 2016 and include all other brands of AFFF. These foams contain polyfluorinated precursors that may chemically transform to PFOA and other PFAS in the environment, and contain PFOA as a by-product of manufacturing (ITRC 2018).
- **Modern Fluorotelomer Foams** which were manufactured from around 2010 to present, contain almost exclusively short-chain (C6) fluorotelomers or short-carbon-chain fluorinated compounds that may still have trace levels of PFOA and PFOA precursors as a byproduct of manufacturing (ITRC 2018).
- **Fluorine-Free Foams**, which do not contain fluorinated compounds.

Recommendations from DFS and MassDEP are:

- **Discontinue the use of legacy PFOS and legacy fluorotelomer foams (pre-2003).**
- **Use modern fluorinated foams only when absolutely tactically necessary.** Some examples include, but are not limited to:
 - For vapor suppression of unignited flammable liquids at an incident with a life safety hazard, such as a motor vehicle accident with patient entrapment with a gasoline spill.
 - For vapor suppression of unignited or burning flammable and combustible liquids to protect significant property.
 - For vapor suppression of unignited flammable liquids at an incident where ignition sources cannot be controlled.
 - For vapor suppression of highly evaporative toxic liquids where the vapor plume may cause health issues to the public and/or responders.
 - Extinguishment of ignited flammable liquids. Note: AFFF and AR-AFFF (ATC-AFFF) foams are NOT intended for use on three-dimensional fires (those that are sprayed as a mist/droplet or flowing liquids). As such, the use of foam in this application will prove to be ineffective.
 - If there is no life hazard or significant property at risk and ignition sources can be controlled, do not use firefighting foam.
 - At a fire where the fuel is burning plastics rather than the flammable or combustible liquid, such as a car fire, the use of straight water or water with a fluorine free additive that meets NFPA 1150 or NFPA 18A (Water Additives for Fire Control and Vapor Mitigation) additive is recommended.
- **Discontinue the use of modern fluorinated foam for training.**
 - There are fluorine free training foam concentrates available.

- **Notification**
 - When PFAS firefighting foam is used, please make a courtesy call to MassDEP Emergency Response 24/7 at 888-304-1133
- **Replace current PFAS foams with Fluorine Free Foam (3F)**
 - A committee has been formed to address the need to find a replacement Class B foam that is fluorine-free and meets UL-162, the Standard for Foam Equipment and Liquid Concentrates. This committee is comprised of members from the Massachusetts Department of Fire Services, Massachusetts Department of Environmental Protection, Connecticut Commission on Fire Prevention and Control, the Connecticut Department of Energy and Environmental Protection (CT DEEP), the Petroleum Industry, and Fire Service leaders. In partnership, several 3F foams were tested and confirmed to be fluorine-free.³ In addition, the committee recommends review of the independent GreenScreen certification of fluorine free foams.⁴
- **Decontamination**
 - MassDEP and CT DEEP have also formed a workgroup to evaluate the decontamination of firefighting equipment (concentrate storage trailers, tanks, piping, etc.) used for legacy and current PFAS-containing foams. This is an ongoing project and results should be available shortly.
- **Funding**
 - MassDEP will continue to fund the “legacy foam” (pre-2003) takeback and disposal program.
 - MassDEP, DFS, and the Fire Chiefs Association of Massachusetts (FCAM) are working together to seek funding to include the collection and proper disposal of current PFAS foams and possibly to purchase replacement foam.

For additional information regarding this Advisory please contact any of the following:

Peter Ostroskey, State Fire Marshal
 Department of Fire Services
Peter.Ostroskey@Mass.Gov

Martin Suuberg, Commissioner
 Department of Environmental Protection
Martin.Suuberg@Mass.Gov

Nicholas Child, Firefighting Foam PFAS Coordinator
 Department of Environmental Protection
Nick.Child@Mass.Gov

References:

- Ross, Racheal (April 30, 2019 02:57 pm ET). <https://www.livescience.com/65364-pfas.html> May 3, 2019
- Interstate Technology and Regulatory Council (ITRC) Firefighting Foam web page https://pfas-1.itrcweb.org/3-firefighting-foams/#3_7

³ Future PFAS-related information from MassDEP will be available through the MassDEP PFAS web page at <https://www.mass.gov/info-details/per-and-polyfluoroalkyl-substances-pfas>

⁴ GreenScreen Certified™ for Firefighting Foams <https://www.greenscreenchemicals.org/certified/fff-standard>



State of Connecticut AFFF Take-Back Program

Draining and Rinsing AFFF from Municipal Onboard Systems

May 2022

Overview of PFAS AFFF Take-Back Program

To reduce public health and environmental risks from releases of per- and polyfluoroalkyl substances (PFAS), the State Bond Commission released legislatively authorized funds in July 2020 to advance the State's [PFAS Action Plan](#) with respect to discontinuing use of PFAS-containing firefighting foam, often referred to as Aqueous Film-Forming Foam (AFFF). In April 2021, the State initiated the AFFF Take-Back Program focused on the collection and safe disposal of containers of AFFF stored at municipal and state fire departments. This effort was jointly managed by the Department of Emergency Services and Public Protection, Commission on Fire Prevention and Control (DESPP-CFPC) and the Department of Energy and Environmental Protections (DEEP). As of April 2022, over 35,000 gallons of containerized AFFF concentrate was collected from more than 250 municipal fire departments and safely disposed at a secure facility licensed to receive PFAS waste.

On July 13, 2021, Connecticut state law banned training with firefighting foam containing intentionally added PFAS, commonly known as AFFF, AR-AFFF, FFFP, AR-FFFP, FP, and FPAR ("Fluorinated Foam" or collectively, "AFFF" for simplicity). The law also banned most other uses of Fluorinated Foam effective October 1, 2021, with some exceptions. See [Public Act 21-191](#) for details.

AFFF Fire Apparatus Decontamination Demonstration Project

Because PFAS surfactants in AFFF coat the walls of storage tanks and associated plumbing within foam systems onboard fire trucks, cleaning is needed to remove AFFF from these surfaces. In Summer 2021, DEEP began an AFFF decontamination demonstration project to evaluate the feasibility and effectiveness of two cleaning agents in removing residual PFAS from fire apparatus, including the state's eight regional foam trailers. The results of this demonstration project were intended to inform development of a cost estimate and standard operating procedure for the future draining and cleaning of AFFF from municipal fire apparatus with onboard foam systems.

Thus far, three foam trailers and three fire trucks have been cleaned, removing most of the AFFF and associated PFAS. With multiple treatments the cleaning agents can remove over 99% of PFAS compared to the high levels found in typical AFFF concentrate. Despite this promising news, the relatively small amount of PFAS remaining within the onboard storage tank and piping after cleaning, though significantly less than the amount found in the old AFFF concentrate, can cross-contaminate new fluorine-free foam

(F3), potentially at a level that may still present a risk to human health and the environment if the new foam were to be deployed.

It is important to note that there are various approaches and techniques to rinse or clean onboard and fixed fire suppression systems prior to switching from AFFF to a F3 concentrate. **However, no single cleaning method has yet been proven to be 100% effective in eliminating residual PFAS concentrations from fire apparatus.** Importantly, federal guidance on best management practices for cleaning municipal fire apparatus that previously contained AFFF and minimum PFAS clean up levels is not yet available.

From a cost perspective, use of proprietary cleaning agents is proving to be more expensive than initially anticipated, and additional funding would be needed to clean the approximately 400 municipal fire apparatus with onboard AFFF systems statewide. With the remaining state funding that is available, DEEP and DESPP-CFPC plan to prioritize the collection and disposal of AFFF concentrate drained from municipal onboard systems to prevent future accidental releases of Fluorinated Foam. The rinsing or full decontamination of the onboard systems is not being performed by the State as part of this effort. Additional information on scheduling the collection of AFFF drained from onboard AFFF systems will be forthcoming.

Recommendations for Municipal Fire Services

DESPP-CFPC and DEEP are recommending the following additional actions to municipal fire services with respect to AFFF remaining in onboard systems:

- ***If AFFF concentrate has not yet been drained from onboard systems, lock-out or remove discharge levers from the pump panel to prevent accidental use/discharge of PFAS-containing firefighting foam.***
- ***Utilize replacement fluorine-free foam (F3) directly from its shipping container using an external eductor when responding to Class B emergency incidents.***
- ***Drain AFFF remaining in onboard systems for future collection and disposal by the State, as funding allows.***
 - ***IF A FIRE DEPARTMENT DECIDES TO REUSE THE ONBOARD FOAM SYSTEM, DEEP and DESPP-CFPC strongly recommend rinsing onboard AFFF systems following the procedure outlined below and containing and storing PFAS rinse water for possible future collection and disposal by the State, as funding allows. Alternatively, arrange disposal of PFAS rinse water at an appropriately licensed facility. Disposal of PFAS waste can be contracted using vendors on the State Department of Administrative Services (DAS) contract No. 16PSX0197, "Removal and Disposal of Hazardous Waste Streams," which is available for use by municipalities. Any new F3 used in apparatus that previously held AFFF or other Fluorinated Foam will likely become cross-contaminated with residual PFAS, and deployment of such foam must still be reported to DEEP.***
 - ***Fire departments are welcome to pursue additional decontamination of apparatus at their own expense. However, proper containment and disposal of PFAS wastewater is required to prevent releases to the environment.***
 - ***Because of the uncertainty surrounding future PFAS regulation at the federal and state level, liability relief to fire departments for future foam deployments using onboard apparatus that previously held PFAS-containing firefighting foam cannot be offered or guaranteed by DEEP.***

Draining AFFF and Rinsing Onboard Equipment

One approach for removing residual Fluorinated Foam from Class B tank systems is a Hot Water (>110° F) Triple-Rinsing procedure, described below. Though not as effective at removing PFAS as proprietary cleaning agents, multiple hot water rinses may remove about 95% of the residual PFAS.

1. Prepare for draining/rinsing

- A. Locate and have available the Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) for each type of Fluorinated Foam concentrate to be drained for waste characterization and disposal purposes.
- B. Establish a secondary containment berm using poly sheeting and absorbent materials around the work area to capture and minimize spread if any AFFF concentrate or PFAS rinse water is spilled. Fire departments with multiple apparatus with onboard AFFF systems should consolidate all draining/rinsing activities and containers at one location.
Note that pursuant to CGS § 22a-450 and the regulations that implement that section, any release of PFAS liquids, including AFFF or AFFF rinse water, must be reported to DEEP's Emergency Response Unit at 860-424-3333.

2. Don Personal Protective Equipment (PPE)

- A. Wear appropriate PPE as recommended by the product's MSDS/SDS. If an MSDS/SDS cannot be located, coveralls or Tyvek suits, nitrile gloves, eye protection, and shoe coverings are recommended.
- B. Label and store used PPE for future disposal in a 55-gallon drum or a triple-plastic bag (2-mil or better).

3. Drain AFFF concentrate from Class B tank systems

- A. Drain any existing AFFF concentrate to the maximum extent possible through the associated plumbing into a dedicated container(s) such as a 55-gallon drum (steel or plastic). Drums can be purchased through vendors on the State DAS contract No. 16PSX0197, "Removal and Disposal of Hazardous Waste Streams," which is available for use by municipalities.
- B. Label the container as "Drained Fluorinated Foam Concentrate" or "Drained AFFF Concentrate" and segregate for future proper disposal.
- C. Minimize the use of additional equipment, such as pumps or hoses, during the draining process to limit the need for cleaning or rinsing of that equipment.
- D. Store container(s) of Drained AFFF Concentrate in an indoor area, if possible, protected from the elements, away from floor drains or catch basins, and within secondary containment or surrounded by booms.

4. Rinse Class B tank system

- A. After draining AFFF concentrate from the onboard system, perform a hot water rinse (>110° F) of the tank system including the plumbing. Hot water is recommended especially if Alcohol-Resistant AFFF (AR-AFFF) was previously stored. Certain cleaning detergents (for example, Simple Green™) can be added to the hot water rinse to further help remove residual concentrate. Power washing of interior tank surfaces may also be employed.
- B. Allow the rinse water to stay in the Class B tank system 30 minutes and carefully agitate or circulate the hot water, if possible, before draining the rinse water through the

- plumbing system into a dedicated container (55-gallon drum). If hot water is not available, allow cool water to remain in the tank system for 1-2 hours. Use caution to avoid excessive foaming of the rinse water. Label this container as "PFAS foam rinsate."
- C. After draining, perform a second hot water rinse and let stand or circulate for 30 minutes before draining through the plumbing system. Add this liquid to the "PFAS foam rinsate" container.
 - D. Perform a third hot water rinse and let stand or circulate for 30 minutes before draining through the plumbing system. Add this liquid to the existing "PFAS foam rinsate" container.
 - E. Store the labeled container(s) in a designated and protected area for future proper disposal. Storage in a covered location within secondary containment is recommended.

Disposal

All AFFF concentrate and rinsate should be containerized and labeled for future disposal. **DO NOT dispose of the AFFF concentrate or PFAS rinse water in the sanitary sewer; an on-site septic system, drywell, or catch basin; or on the ground surface.** Doing so constitutes a reportable release of such material pursuant to CGS § 22a-450 and could cause soil, groundwater, and/or surface water contamination, which may impact drinking water wells, streams, fisheries, and/or require environmental remediation at your expense.

Safety Data Sheets identifying the type of Fluorinated Foam concentrate removed from systems are needed to identify the material for proper waste disposal purposes. The State of Connecticut intends to collect the onboard AFFF concentrate and PFAS rinsate, as funding allows.

Use of Replacement Fluorine-Free Foam (F3) Concentrate

Pursuant to Section 1 of Public Act 21-191, and in an [order](#) dated June 30, 2021, DEEP identified National Foam Universal F3 Green Class B firefighting foam as an alternative to AFFF containing intentionally added PFAS. Other firefighting foam products that have received GreenScreen™ certification may also be available for use. See [GreenScreen Certified™ for Firefighting Foam | GreenScreen® For Safer Chemicals \(greenscreenchemicals.org\)](#) for the firefighting foam standard and [GreenScreen Certified™ Products | GreenScreen® For Safer Chemicals \(greenscreenchemicals.org\)](#) for the list of certified F3 products.

While municipalities may purchase replacement F3 concentrate from any vendor, municipalities may choose to purchase National Foam Universal F3 Green under the DAS contract **No. 21PSX0028AA**. This contract was established for the DESPP-CFPC, all using State agencies, political subdivisions, and not-for-profits. **State funding allotted for the collection of AFFF does not provide for the purchase of replacement foam.**

Contacts

If you have any questions, or when you are ready for the State to collect your AFFF concentrate, you may contact the Commission on Fire Prevention and Control at foamsurvey@ct.gov or call **Jeff Morrisette at 860-566-0690**.