Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection
One Winter Street Boston, MA 02108 • 617-292-5500

MassDEP Legacy Firefighting Foam Take-Back Program
2018 Project Summary

By Nicholas J. Child, MassDEP - 01/10/19

This document provides a summary of the Massachusetts Department of Environmental Protection's (MassDEP) project for the collection and proper disposal of legacy Aqueous Film Forming Foam (AFFF) stored by municipal fire departments and other public safety partners in Massachusetts.

Poly- and Per-Fluoro Alkyl Substances (PFAS) have been identified as man-made emerging contaminants that can cause health issues at very low concentrations (in parts per trillion). PFAS are generally mobile, persistent, and bioaccumulate in the environment. These chemicals have been used in numerous common products, such as "Teflon" cook wear, waterproof clothing, carpet, paint, and food packaging. PFAS have also been used in firefighting foam; specifically, Class B AFFF, which is used to extinguish burning hydrocarbons or flammable liquids. MassDEP gathered information from other states' regulatory agencies and the foam manufacturing industry and confirmed that these legacy foams contain between 2%-5% PFAS by volume. In consultation with the Massachusetts Department of Fire Services, MassDEP chose to assist with this issue in order to resolve the potential conflict between public safety uses and environmental health impacts, and to ensure that the legacy foam is properly disposed of rather than used during trainings or firefighting and released into the environment.

Figure 1 - 3M AFFF foam

Based on research and discussion with surrounding states' environmental agencies, MassDEP chose 2003 as the cutoff year for this program, with the intention of including the last PFAS foam production year of 2002, and one additional year to account for legacy foam which may have been in the process of distribution and sales after production stopped. Recognizing the challenges proper disposal would present to the budgets of most municipalities, MassDEP decided to fund the disposal of these legacy foams through its Massachusetts Chapter 21E/Bureau of Waste Site Cleanup (BWSC) bond bill, consistent with programmatic goals of "pollution prevention" and elimination of "threats of release" of hazardous materials.

MassDEP maintains contracts with several hazardous material cleanup contractors. For this project, the agency required a contractor with expertise handling more hazardous chemicals to assure a comprehensive and safe removal program. To that end, we asked our contracted cleanup companies to provide proposals, including a plan for the program and the expected cost. Five of MassDEP's contractors were not interested. Three stated interest, but two of these were significantly more expensive than the third. The remaining state contractor had the cheapest disposal rate (55 cents/lbs.) and the best plan. The contractor requested a review by MassDEP's hazardous waste program to confirm that this legacy AFFF was non-hazardous for the purpose of transport and disposal. MassDEP and our contractor developed a plan for the waste disposal stream to go to a fuel-blending facility in Ohio, which packages the final material for destruction at one of two state-of-the-art Refuse Derived Fuel Incinerators.

MassDEP provided our partners at the Massachusetts Department of Fire Services and the State Fire Marshal's Office with a summary of the issues, and included emerging concerns being raised in fire service publications about firefighter exposures to this type of foam. The Fire Marshal supported the program, particularly because MassDEP would be funding the disposal rather than the cost being born by local fire departments.

Figure 2 - Nick Child of MassDEP & Mike Robertson of NEDT

The initial expectation was that the bulk of Class B legacy foam would be found at airports because of Federal Aviation regulations requiring fluorine-containing foam. Municipal fire departments were anticipated to have two to five, five-gallon containers of foam concentrate each.

It was determined that this would be a take-back program, not a buy-back program. MassDEP would pay for the removal, but it would be up to the fire departments to replace the foam as they saw fit. A budget of up to $25,000 was established for the program. Subsequently information gathered from a limited phone survey to fire departments in towns with or immediately next to airports demonstrated that this budget would not be adequate. MassDEP extended a statewide take-back offer to fire departments through the Fire Marshal's office and a press release shortly after. Having the initial outreach message delivered by the State Fire Marshal to every fire department provided immediate recognition and credibility to the effort. Follow up outreach through a MassDEP press release and a second round of communication through the Fire Marshal were immediately followed by more calls from fire departments wishing to participate.

As the project progressed, amounts of legacy foam held by fire departments significantly exceeded expectations. Also, MassDEP initially planned to have each fire department self-transport their legacy foam to the contractor's two facilities in Massachusetts. After reviewing photos of many of the legacy foam containers (some more than 50 years old), we determined that all containers needed an integrity inspection before transport. Given that requirement, it was faster and easier to have our contractor

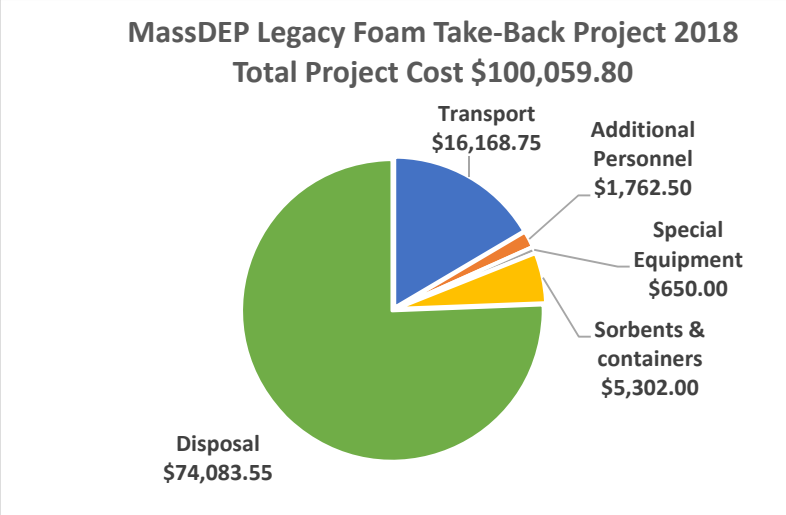
arrange to collect the containers from each fire department. The budget was raised to $100,000 to support the increased scale of the project.

Over five months, MassDEP was contacted by 86 fire departments/public safety entities. MassDEP developed a master list of locations, volumes, container sizes, and photographs. Responses fit into four groups:

- 28 fire departments confirmed that they no longer had legacy foam. This included several major cities in the Commonwealth where we had anticipated that large amounts of legacy foam may have existed.
- 53 fire departments confirmed that they had small quantities of legacy foam and needed help with its disposal. These were all small volumes as originally expected, but at locations spread across the state from the tip of Cape Cod to the corner of the Berkshires. These 53 fire departments accounted for 27.7% of total legacy foam recovered.
- 4 fire departments/public safety entities confirmed they had legacy foam and needed help with disposal. These were all very large volumes from area foam caches or fire/safety entities with major facilities in their jurisdiction. These four accounted for 73% of total foam recovered.
- 1 fire department was unable to participate due to inability to afford replacement foam and complexities of Federal Aviation Administration (FAA) rules. They still have 13,600 pounds (or 1,600 gallons) of legacy foam. MassDEP is working with this fire department beyond the scope of this project.

As the take-back program progressed, many fire departments requested confirmation that current Class B AFFF foam was safe. Much of this newer foam still contains some amount of PFAS, although at significantly lower levels than the legacy foam. There is very little research into the impacts of this type of foam. New "Fluorine Free Foam" aka "3F" foam is entering the market. The cost is comparable per gallon to current foam, but there are questions about its efficacy compared to the current Class B AFFF foams. MassDEP looks to the Fire Service to answer any questions about its efficacy for fire suppression.

The total volume of legacy foam identified, removed, and destroyed was 134,756 pounds (or 15,866 gallons). The final cost of the project was $100,059.80. The costs can be categorized as 74.1% on disposal; 16.2% on transport; 5.3% on sorbents/containers; and 2.4% on specialized personnel and equipment. Based on the amount of legacy foam recovered, the decision to proceed as a take-back program instead of a buy-back program proved wise. Replacing gallon for gallon would have cost an additional $3,000,000, which would have made the project untennable.



The project was a success. Working with the Massachusetts Department of Fire Services significantly helped in encouraging participation and demonstrated two agencies working in the same direction. Every local fire department was thankful for the help and particularly thankful that this was not an unfunded mandate. The collection, transport, and disposal operations went as planned without mishap or difficulty. In addition, the project highlighted the need for a transition to fluorine-free foam or another alternative that is as effective but less toxic in the near future. It is anticipated that small amounts of additional legacy foam will likely be found in less-used storage areas at fire departments over the coming months, however the majority has now been removed before it could be released to the environment.