

AFFF PHASE OUT IN THE ARCTIC

FACTSHEET

2021



An Arctic Council project has been initiated to transition from firefighting foam agents currently used to control flammable liquid fires because of concerns with their environmental and occupational health performance to types that do not exhibit these concerns.

THE CURRENT ISSUE

Aqueous film-forming foam (AFFF) is an extinguishing agent used to extinguish flammable liquid fires. It is used in many different sectors and has been the extinguishing agent of choice for these hazards for many years.

In most cases it has been used in training, testing and actual incidents without any attempt to contain it or treat it before allowing it to disperse to the ground or water.

In recent years there has been growing concern about the long term environmental and health effects of one specific family of chemicals that is used extensively in this type of firefighting foam – Per- or Poly-fluoroalkyl substances (PFAS)¹.

¹ <https://www.oecd.org/chemicalsafety/portal-perfluorinated-chemicals/aboutpfass/> ; <https://www.eea.europa.eu/publications/emerging-chemical-risks-in-europe>



FOR MORE INFORMATION:

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OVERALL PROJECT OBJECTIVES

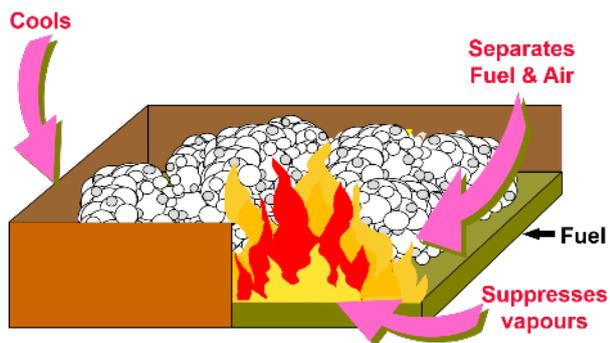
- To identify fluorinated firefighting foam users and applications
- To develop cost effective and appropriate recommendations for the removal of PFAS based firefighting foams for all applications within the Arctic region, and replacement by foams that do not have the same environmental and health effect concerns, without jeopardising levels of risk reduction.
- To arrest legacy issues at current levels
- To provide guidance, training and protocols on the transition to effective alternatives

Project leads: Finnish Environment Institute (SYKE) and U.S. Environmental Protection Agency

Participating countries: CA, DK, FI, IS, NO, RU, SE, US

Consultants: ENRgConsultants (UK), Evgeny Tretyakov (RF)

ENRg Consultants is a specialist Fire Hazard Management independent consultancy company with particular experience and expertise in foam application on a global basis.



The Fire Triangle
The three elements
you need for a fire



Foam breaks the triangle
by separating the fuel
from the oxygen in air

WHAT IS PFAS?

PFAS are a large group of chemicals widely used in industrial and consumer applications since the 1950s, usually where extremely low surface energy or surface tension and/or durable water- and oil-repellency is needed, e.g., chromium metal plating, various fire-fighting foams, or for surface treatment of textiles, carpets and papers.

PFAS, a group of more than 4 700 chemicals, are known to be highly persistent in the environment and have been frequently detected in humans, wildlife and environmental media worldwide². In fact, they are known to persist in the environment longer than any other human-made substance and many of them have been found in the Arctic as a consequence of long-range environmental transport. As a consequence of this persistence, as long as PFAS continue to be released to the environment, humans and other species will be exposed to ever greater concentrations of PFAS. Even if all releases of PFAS were to cease tomorrow, they would continue to be present in the environment, and humans, for generations to come. Certain PFAS are also known to accumulate in humans causing serious health effects such as cancer and liver damage³.

WHAT IS AFFF?

HOW DOES IT WORK?

Water alone cannot be used effectively to extinguish fires in flammable liquids – in fact in most cases application of water could spread the fire and escalate the consequences. Instead, foam, that will float on a liquid fuel surface, is used. This foam is produced by mixing water with specially formulated chemical concentrate and then adding air to make bubbles that are applied to the fuel surface, thus separating the fuel from oxygen in the atmosphere and extinguishing the fire and prevent it reigniting.

Foam also helps cool the fuel and any hot objects in the fire helping to reduce the possibility of reignition.

WHERE IS AFFF USED?

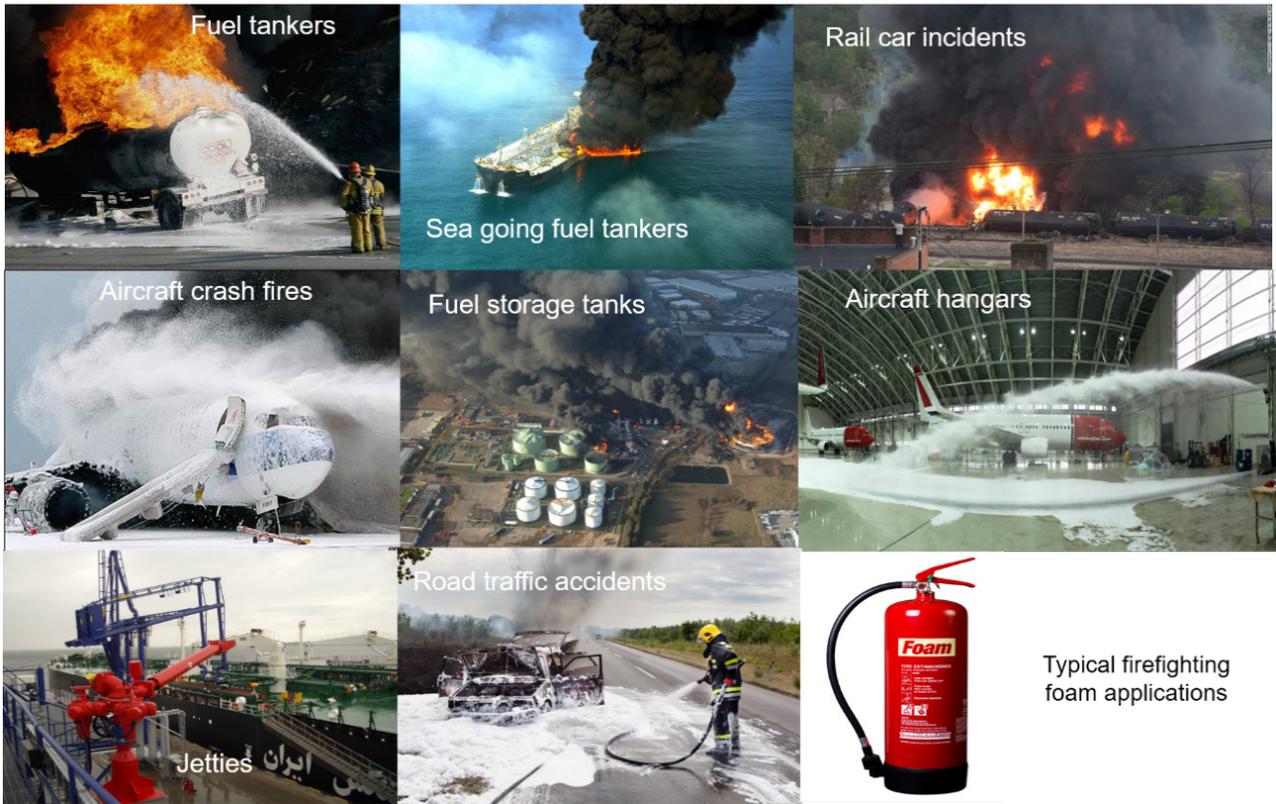
Foam is used by industry, commercial and government sectors for incidents such as fuel storage tank fires, aircraft crash fires, vehicle accidents where fuel spill occurs, and marine facilities handling fuels where there is the potential for a flammable liquid fire.

INTERNATIONAL RESTRICTIONS

The Stockholm Convention prohibits production and use of PFAS that are listed in Annex A or Annex B as persistent organic pollutants (POPs). As of 2021, perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds and perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF) are listed under the Convention with exemptions for certain applications, including fire-fighting foam. When using fire-fighting foam containing PFOS or PFOA, countries need to follow the conditions provided in the Convention. In addition, perfluorohexane sulfonic acid (PFHxS), its salts and PFHxS-related compounds will be considered for listing in Annex A in 2022 and long-chain perfluorocarboxylic acids, their salts and related compounds are under review by the scientific expert group, the POPs Review Committee of the Stockholm Convention.

2 OECD/UNEP Global PFC Group, Synthesis paper on per- and polyfluorinated chemicals (PFCs), Environment, Health and Safety, Environment Directorate, OECD. 2013.

3 <https://www.epa.gov/pfas/basic-information-pfas>; https://www.epa.gov/sites/production/files/2018-03/documents/pfasv15_2pg_0.pdf; <https://www.eea.europa.eu/publications/emerging-chemical-risks-in-europe>



HOW WILL THE PROJECT BE CARRIED OUT?

The project will be managed by a Steering Panel comprising Arctic Council country representatives and other stakeholders with expertise and experience in foam usage.

A phased approach will be taken and the emphasis will be on providing practical, workable guidance on making the transition

Although the most important aspect of a firefighting foam is obviously its firefighting performance, there are other important aspects of the transition process, all of which will be considered during the project and accounted for in the guidance developed:

- Suitability for Arctic Environment
- Compatibility with and/or changes to application systems and equipment
- Environmental impact
- Procedures for cleaning out the residues from the equipment and extinguishing systems
- Disposal methods for old foam
- Preplanning for and training in the use of new foams

PROJECT PHASES

PHASE 1 - DATA COLLECTION & ASSESSMENT OF CURRENT SITUATION

- Review of current legislative fire and environmental requirements in Arctic states
- Collecting data on the current situation including local legislative requirements and current foam application practices
- Identification of foam users by sector and facility
- Review of the components of the foams currently used to confirm foam types
- Collating relevant international best practice guidance
- Developing data gathering and analysis templates

PHASE 2 - PILOT STUDIES

- Selection of typical facilities for site visit within each end user/industry
- Site visits for pilot studies and use of analysis tool
- Summary report on findings of pilot studies outlining requirements of those protocols, options and policies for implementation of transition.
- Feasibility and cost estimates for selected transition proposals.

PHASE 3 - DEVELOPMENT OF INITIAL PROTOCOLS, POLICIES & OPTIONS AND ASSOCIATED PROCEDURES (BASED ON TOTAL CHANGEOVER) AND DISSEMINATION OF KNOWLEDGE

- Protection Methods or other fire hazard management measures
- Removal & disposal options for existing foam stock
- Clean up of equipment, etc.
- Performance specification and environmental effects data for future foam concentrates
- Reinstatement of systems/commissioning of systems
- Future containment, collection and disposal of fire water/effluent
- Training
- Ongoing Assurance
- Emergency planning for foam control at incidents
- Development of recommended timescales for implementation and evaluation of implementation programme throughout the Arctic region
- Development of awareness raising material and training programmes