International Civil Aviation Organization

Aerodrome Safety & Planning Implementation Group

Seventh Meeting (ASPIG/7)
(Riyadh, Saudi Arabia, 6 – 10 April 2025)

Agenda Item 2: Regional Performance Framework for Aerodrome Safety

Phasing Out PFOA/PFOS-Containing in Aircraft Firefighting Foams

(Presented by the State of Saudi Arabia)

SUMMARY

This paper presents the global transition from Perfluorooctanoic acid (PFOA) / Perfluoro octane sulfonic acid (PFOS) - containing firefighting foams in aircraft rescue and firefighting services (ARFF). It highlights environmental risks, regulatory actions, challenges in adopting PFAS-free alternatives, and ICAO's role in supporting Member States in this transition.

Action by the meeting is at paragraph 3.

REFERENCES

- ICAO Annex 14, Volume I – Aerodrome Design and Operations
- ICAO Doc 9137 – Airport Services Manual, Part 1: Rescue and Firefighting
- FAA Reauthorization Act of 2018
- FAA Aircraft Firefighting Foam Transition Plan
- EU REACH Regulation (EC No 1907/2006)
- UK CAA Guidance on PFAS-Free Firefighting Foams
- Environmental Protection Agency (EPA) PFAS Regulations

1. INTRODUCTION

1.1 Perfluorooctanoic acid (PFOA) and Perfluoro octane sulfonic acid (PFOS) belong to the polyfluoroalkyl Substances (PFAS) group, which has been commonly used in firefighting foams for aircraft rescue and firefighting (ARFF) operations. However, concerns over their lasting environmental impact and potential health risks have led to global regulatory efforts to phase them out. This paper highlights the importance of ICAO MID Region offering guidance to help Member States shift to PFAS-free alternatives.

2. DISCUSSION

Environmental and health impacts of PFOA/PFOS

2.1 The PFOA/PFOS can pose many adverse effects, such as the following:

- PFAS compounds persist in the environment, bioaccumulate in organisms, and pose long-term ecological and health risks.
- PFOA/PFOS exposure is associated with cancer, liver damage, immune dysfunction, and developmental toxicity.
- Scientific Studies link PFAS exposure to risks for firefighters and communities.
- PFAS-containing foams have contaminated soil, groundwater, and surface water at airports.
- Airports face major challenges managing legacy contamination when phasing out PFAS firefighting foams.

International Status and challenges in regulation and transitioning among the States

2.2 The following regulations actions and developments are being made among the Sates:

- The FAA Reauthorization Act of 2018 mandated a transition to fluorine-free firefighting foams (F3) by 2024 for airports under FAA jurisdiction.
- The Environmental Protection Agency (EPA) has been tightening regulations on PFAS-containing foams, with states like California, Washington, and New York implementing bans.
- The UK Civil Aviation Authority (CAA) has encouraged airports to eliminate the use of PFAS-based foams and transition to fluorine-free foams (will be banned by July 2025).
- The EU has banned PFOA and PFOS under the EU REACH Regulation (Regulation (EC) No 1907/2006). Since 2020, the use of PFOA, its salts, and related compounds has been restricted.
- Airports in Europe are mandated to phase out PFOA-containing foams and adopt fluorine-free alternatives.
- The Australian government has taken significant steps to eliminate PFAS-based foams at airports, with many transitioning to fluorine-free solutions.
- Canada is phasing out PFAS-based foams and is reviewing alternative firefighting agents for airport use.
- Middle Eastern Civil Aviation Authorities have been monitoring international developments but have yet to implement strict bans similar to Europe or the U.S.
- Singapore and Hong Kong have begun trials of fluorine-free foams.
- While a few airports globally have adopted safer fluorine-free foams (F3), most still use PFAS-containing foams, though regulations are pushing a transition to PFAS-free alternatives.

Current challenges

2.3 Currently the aerodromes face the following challenges, regarding the transitioning:

- PFAS-free foams may perform differently in fire suppression scenarios, requiring additional testing and training.

- Replacing existing foam stocks and modifying equipment for PFAS-free foams entails significant financial investment.
- Safe disposal of legacy PFAS foams and contamination mitigation efforts require careful planning.
- Many airports are dealing with contamination from legacy PFAS usage in soil and groundwater.

Impact on Aircraft Rescue and Firefighting Services

2.4 Airports must transition to PFAS-free firefighting foams while maintaining ICAO and local regulatory compliance. Additionally, older firefighting vehicles and equipment may require modifications to handle fluorine-free foams. Furthermore, Airports should conduct training and certification programs to familiarize firefighting teams with new foam technologies.

PFAS-Free Foam Alternatives

2.5 Available PFAS-free foams (F3) demonstrate varying levels of effectiveness under different fire scenarios and ongoing research and testing are necessary to ensure operational readiness. Additionally, the global supply of PFAS-free foams is expanding, but costs and regional availability vary. Furthermore, the replacement foams should not only be PFAS-free but also free of other harmful chemicals to avoid future regulatory challenges.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) Encourage Member States to adopt their own regulations for safer firefighting solutions.

b) Encourage Member States to take proactive steps to phase out PFOA/PFOS-containing foams.

c) Encourage Member States to collaborate to ensure a smooth transition while maintaining fire safety standards.
