PFAS Use in Fire Fighting Foams: Evolution of Fire Fighting Agents and Critical Decision Criteria

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April 2015

Introduction

Over the past 10-15 years and particularly the past two, fire fighting foam agents of all types – Fluorine-free (FFF) and Fluorinated (AFFF) – have been a subject of attack, b) news in the e) concerns of academic x), d) the focus of academic global as well as regulators and new regulations in various countries, c) their performance debated, f) the focus of significant research and development activities to produce the most effective and more sustainable short-chain fluorotelomer-based agents and d) the focus of industry and industry groups to provide safer and better practice handling guides. In addition to AFFF, fluorinated surfactants and repellents of all types and chain lengths have been scrutinized for their toxicological properties, their environmental fate and effects (EE&L), their PBT properties and their Persistence (P) and Mobility (M) properties and been questioned whether they are needed at all in any applications. The objective of this poster discussion will be to establish where these valuable fluorinated products are needed and where they should be used – and not. The environmental impacts of smoke and combustion products must also be considered. We suggest there needs to be a balance struck between uses of the precautionary principle, a risk-based approach and required performance/value-in-use. This balance or hurdle point, which will be explored here, is often cast aside in favor of emotion of sorts.

Evolution of Fire Fighting Agents

Water
 wChemical Mechanical
wAFFF -> Lighter by 3M
wModern FFF
wFT-based AFF
wFluorotelomer-based AFF

The Coordinated Campaign Against Fluorine

• Shift from PBT (all 3) to PB(80% T) to just P1! (aka Fluorine Free Class C)
• Regulate/Classify PFS as a Single Category – Grouping
• Definition is evolving from PFFOS/PFOA/Perfluorocarboxylates vs. PFS = Fluorine
• Goal to Eliminate All Fluorinated Substances
• Claims Unjustified as they Ignore Robust Body of Peer-Reviewed Data: Use Opinion and Speculation in Place of Science and Facts
• ‘Burn’ the World of PFAS Chemistry: Ignore Best Practices

QPL Products and Suppliers

PFAS: Perfluorooctyl substances; PFOA: Perfluorooctanoic acid; PFHxS: Perfluorohexanoic acid Sulfonic

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Conclusion

The Conversation has Shifted from Performance to Persistence and Pesticide is all that Matters. ‘Perception’ is Critical. Users of PFAS Products Must Consider the Toxic Profile, the Potential for Exposure, Prevention of Emissions, Protection of Property, People and the Environment and Use of Risk-based Analysis vs. the Precautionary Principle.

Foam Selection – Comparison of AFFF vs FFF

Environmental vs. Comparison of AFFS vs FFF

Important Considerations to Consider

• When one considers both “Duty of Care” and “Life Safety” and “Performance Matters”, it becomes very clear that use of AFFS has to be considered in order to extinguish Class B liquid fires in many circumstances.

• Fire fighters and facility managers must consider the following: extinguishment time and time to control the fire, burnback resistance and control of “Let it Burn”. In addition, when comparing an AFFF agent to the use of FFF agents one needs to strongly consider foam products including fuel repellency, film formation, foam spreading on fuel, fuel spreading in foam as well as volume of firewater runoff, fire escalation potential, generation of toxic smoke and breakdown products along with active surfactant(s)/polymer(s) bioaccumulation, mobility, persistence and aquatic toxicity.

• And as noted, a holistic/balanced approach will clearly show there is room for both types of products – Fluorine-free and fluorinated. Care must be taken to control releases of whatever agent is used regardless of type. Following best practice guidance is crucial to safeguarding the neighboring areas and overall environment.

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