PFOA/PFOS
Legacy Fire Fighting Foam

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Regional Response Team
Joint Meeting
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PFAS 101 – What is it?

• Poly and Per Fluoro Alkyl substances
  • Man-made class of 3,000+ chemicals invented in 1930’s
  • Carbon/fluorine chain bodies with a variety of heads
  • Long chain – 8 or more carbons are fluorinated
  • Short chain – 7 or less carbons are fluorinated

• Health effects
  • Many variants have no study data
  • Generally bioaccumulate
  • Generally very mobile in groundwater
  • Generally very stable compounds resisting degradation
  • Generally travel from mother to fetus or during breastfeeding
  • Generally reduced immune responses
  • Generally thought to be carcinogenic
PFAS 101 – Uses / Sources

- Paper & Packaging
- Clothing & carpets
- Outdoor textiles & sporting equipment
- Ski & snowboard waxes
- Non-stick cookware
- Cleaning agents and fabric softeners
- Polishes and waxes
- Latex paint
- Pesticides & herbicides
- Hydraulic fluids
- Windshield wipers

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- Hydraulic fluids
- Windshield wipers
- Paints, varnished, dyes, and inks
- Adhesives
- Medical products
- Personal care products (shampoo, hair conditioners, sunscreen, cosmetics, toothpaste, dental floss)
- Public Safety (Fire Fighting gear & Fire fighting foam)

Source: ITRC Nov. 2017
Types of Fire Fighting Foam

• **Class A Foams**
  • Intended for normal combustibles (paper, wood, cotton/wool cloth, etc.)
  • Water penetration by reducing surface tension
  • Aka wet water, wetting foam, forestry foam, high expansion, etc.
  • Not the foam class of concern

• **Class B Foams**
  • Intended for flammable liquid fires
  • Forms a barrier between fuel and water/foam
  • Fluorocarbon surfactants form the barrier
  • This is the foam class of concern
Why do firefighters use it?
Rules & Requirements

• Mil-PRF-24385F(SH)
  • “Requirements....Materials... Concentrates shall consist of fluorocarbon surfactants plus compounds as required to conform to the requirements hereinafter. The material shall have no adverse effect on the health of personnel when used for its intended purpose......”

• FAA Advisory Circular 150/5210-6D
  • “firefighting foam for aircraft is currently required to meet the millspec....”

• H.R. 4 – FAA Reauthorization Act of 2018, Sec 203
  • “…shall not require the use of fluorinated chemicals to meet the performance standards” for class B foams.
Airports
Massachusetts Airports
Airport Cooperative Research Program

• Report 173: Use and Potential Impacts of AFFF Contain PFASs at Airports 2017
  • 72% of airports performed firefighting training using AFFF
  • Of those, 79% discharged AFFF onto the ground
PFAS Health Advisory

• EPA focus on 2 compounds
• MassDEP focus on 5 compounds
  • PFOA, PFOS, PFNA, PFHpA and PFHxS (8-, 8-, 9-, 7- and 6- carbon chain lengths, respectively)

• Analogies for 70 Parts Per Trillion (ppt)
  • 70 square inch in 250 square miles
  • 70 inches in 16,000,000 miles
  • 70 seconds in 31,500 years
  • 70 grains of sugar in an Olympic sized pool
Bans on PFAS in firefighting Foams

• Washington State
  • HB 2793/SB 6413
    • Signed by Governor Inslee on 3/27/2018
    • Bans use of PFAS containing foam for training beginning July 1, 2018
    • Bans sale of PFAS containing foams beginning 7/1/2020
    • Requires notification regarding firefighting hear that contains any PFAS.

• Norway
  • Civilian airports adoption of fluorine free foam 2011
  • Military adoption of fluorine free 2015

• Australia
  • Banned all fluorinated AFFF for all applications 1/30/2018
  • Verified fluorine free foams meet highest level of International Civil Aviation Organizations extinguishment tests.
Massachusetts DEP Project

**Priority Messaging**
- Avoid casting this as public safety v.s environment
- Don’t encourage massive training night
- Four rounds of notices to every fire department
  - First and third notices were from State Fire Marshal
  - Second and fourth were from MassDEP

**Mechanics**
- Phase 1 – Notification (MassDEP & MassDFS)
- Phase 2 – Fire Department request to be included (ask FDs to tell neighbors)
- Phase 3 – Develop master list
- Phase 3 – Contractor pickup / two drop-off locations (Non-Haz MA99)
- Phase 4 – Transport to Vexor, Medina Ohio to become “engineered fuel”
- Phase 5 – Incineration
  - Covanta Niagara NY
  - Covanta Indianapolis IN
  - Detroit Renewable Energy, Detroit MI
- Phase 6 – Replacement foam (concept)
Massachusetts Participants with legacy foam

- Ashby
- Ashland
- Ayer
- Barnstable
- Barre
- Belchertown
- Borne
- Brewster
- Cambridge
- Charlton
- Chester
- Chicopee
- Colrain
- Cummington
- Deerfield
- Dudley
- Eastham
- Easthampton
- Erving
- Everett
- Falmouth
- Gardner
- Gill
- Grafton
- Hamilton
- Heath
- Hingham
- Holbrook
- Holden
- Holyoke
- Hudson
- Lenox
- Leverett
- Ludlow
- Malden
- Mashpee
- New Bedford
- Northbridge
- Palmer
- Pembroke
- Phillipston
- Pittsfield
- Plymouth
- Provincetown
- Rockland
- Rowe
- Rowley
- Salem
- Sandwich
- Shutesbury
- Somerset
- Sudbury
- Sutton
- Topsfield
- Townsend
- Wenham
- Williamstown

Special
- MassDOT CANA Tunnel Charlestown
  - Joint Base Cape Cod Fire Dept.
Massachusetts Participants with no legacy foam

- Andover
- Auburn
- **Boston**
- Devens
- **Fitchburg**
- Grafton
- Groton
- Harvard
- Hull
- Littleton
- Lynn
- Marion
- Marlborough
- Middleborough
- Nantucket
- New Marlborough
- Raynham
- Sharon
- Shrewsbury
- **Springfield**
- Sterling
- Stow
- Upton
- West Barnstable
- West Bridgewater
- Westport
- **Worcester**
Sources & Volumes of Legacy AFFF

Summary as of 10/25/18
- 81 responses
  - 57 requesting help
  - 27 no foam
- Volume - 123,140 lbs / 14,487 gal concentrate
- Projected Cost - $90,000

Small volume locations (17,242 lbs / 2,029 gal)
- Sandwich FD - 13,520 lbs / 1,591 gal
- Everett FD - 20,258 lbs / 2,375 gal
- Pittsfield Regional - 22,820 lbs / 2,685 gal
- MassDOT CANA Tunnel - 35,700 lbs / 4,200 gal
- JBCC - 13,600 lbs / 1,600 gallons

Large volume locations (105,898 lbs / 12,459 gal)
- Sandwich FD - 13,520 lbs / 1,591 gal
- Everett FD - 20,258 lbs / 2,375 gal
- Pittsfield Regional - 22,820 lbs / 2,685 gal
- MassDOT CANA Tunnel - 35,700 lbs / 4,200 gal
- JBCC - 13,600 lbs / 1,600 gallons
Massachusetts Metrics

- 57 fire department requesting help
- 2 Specials
  - MassDOT
  - JBCC Fire Dept.
- 27 fire departments confirm no foam
- Concentrate taken
  - 123,240 lbs
  - 14,487 gallons
Massachusetts Lessons Learned/ Reinforced

• Has to be a partnership with state Department of Fire Service.
• Fire departments are pack rats.
• Clear message not to use old foam in training.
• This program was to eliminate the “legacy foam” (i.e. pre-2003).
• Clearly emphasize this is a “take back” not a “buy back”.
• There is still a generation of newer AR-AFFF out there in large amounts that have PFAS as shorter chains (C6) and are marketed as “environmentally safer”.
• Fluorine free foams (F3) are new and there is not a lot of data.....
Operational directive - Foam cleanup

• When Class B foam is applied on a major flammable liquid incident, require cleanup.

• Will be cases where no flammable liquid was released and foam was precaution. “Threat of Release”.

• Data showing quick vacuum and scarification are best proactive.

• Make sure contractors have “defoaming agents” with them.
Foam Research

• New York State Pollution Prevention Institute (NYSP2I) study.
  • Define parameters for foam testing.
  • Identify foams containing short chain (14 brands).
  • Identify product application, product description, Chemical Abstracts Service Registry Number (CAS), and percent of disclosed ingredients.
  • Identify 100+ “fluorine-free” firefighting foam products from 25 manufacturers.
  • Summarizes the results of precursor work to assist with scoping a future alternatives assessment of alternatives to PFOA and PFOS in Class B aqueous film forming foam (AFFF).
• Publication date: 2019???
Fluorine Free Foams

• Cost
  • Current AR-AFFF = $200/5-gal
  • Fluorine Free = $200-$400/g-gal

• Brands
  • Angus – Jetfoam, Respondol
  • National Foam – Universal Green
  • Auxquimia – Unipol
  • Vsfocum – Silvara
  • BioEx – Ecopol
  • Fomtec – Environ 3x3 Plus
  • Solberg – Rehealing Foam RF6/RF3
  • BioSafety Tech – Trident
  • 3F – FreforSF, Hyfex, Freedol SF
Questions?

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