

PFOA/PFOS Legacy Fire Fighting Foam

Nick Child MA DEP

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
- Pesticides & herbicides
- 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)

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**

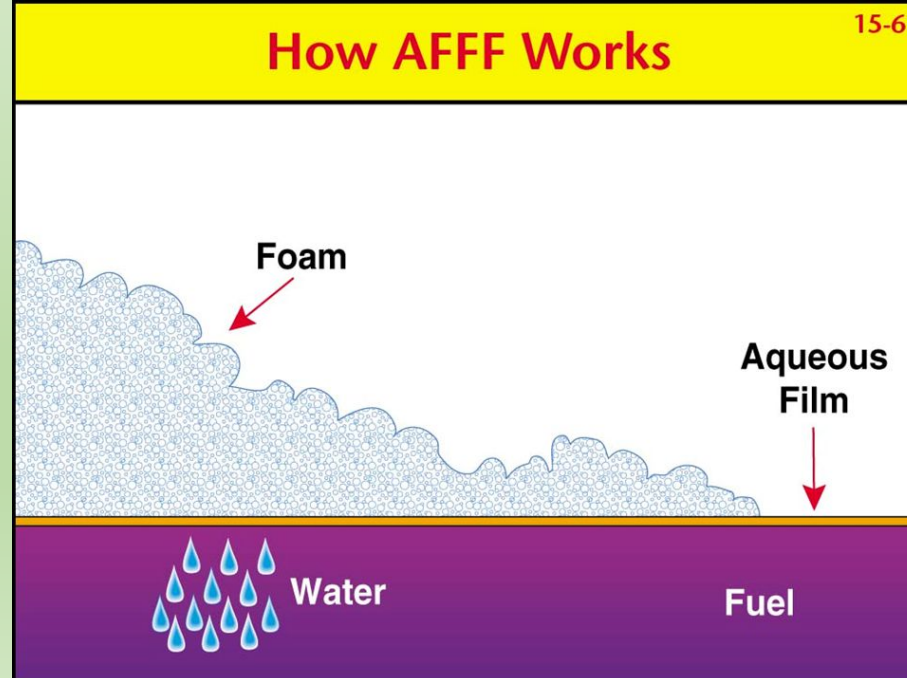
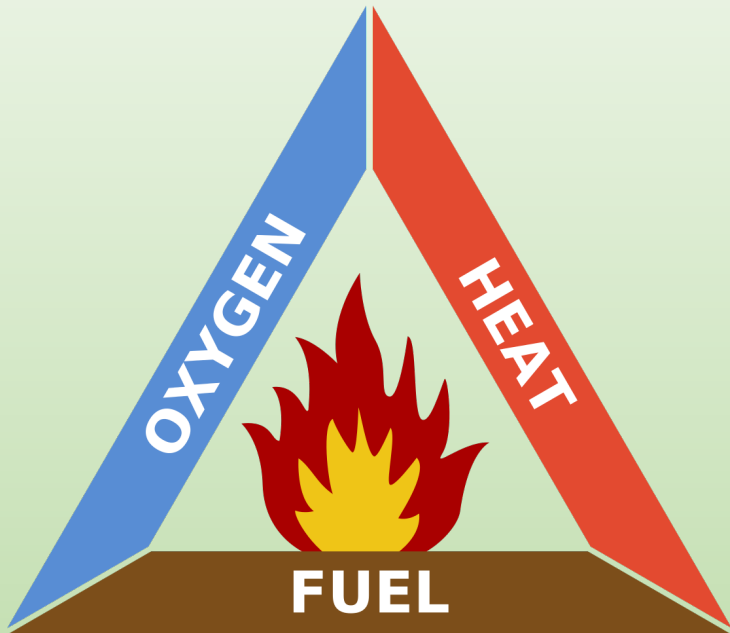


- **Class B Foams**

- 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 we 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.....”

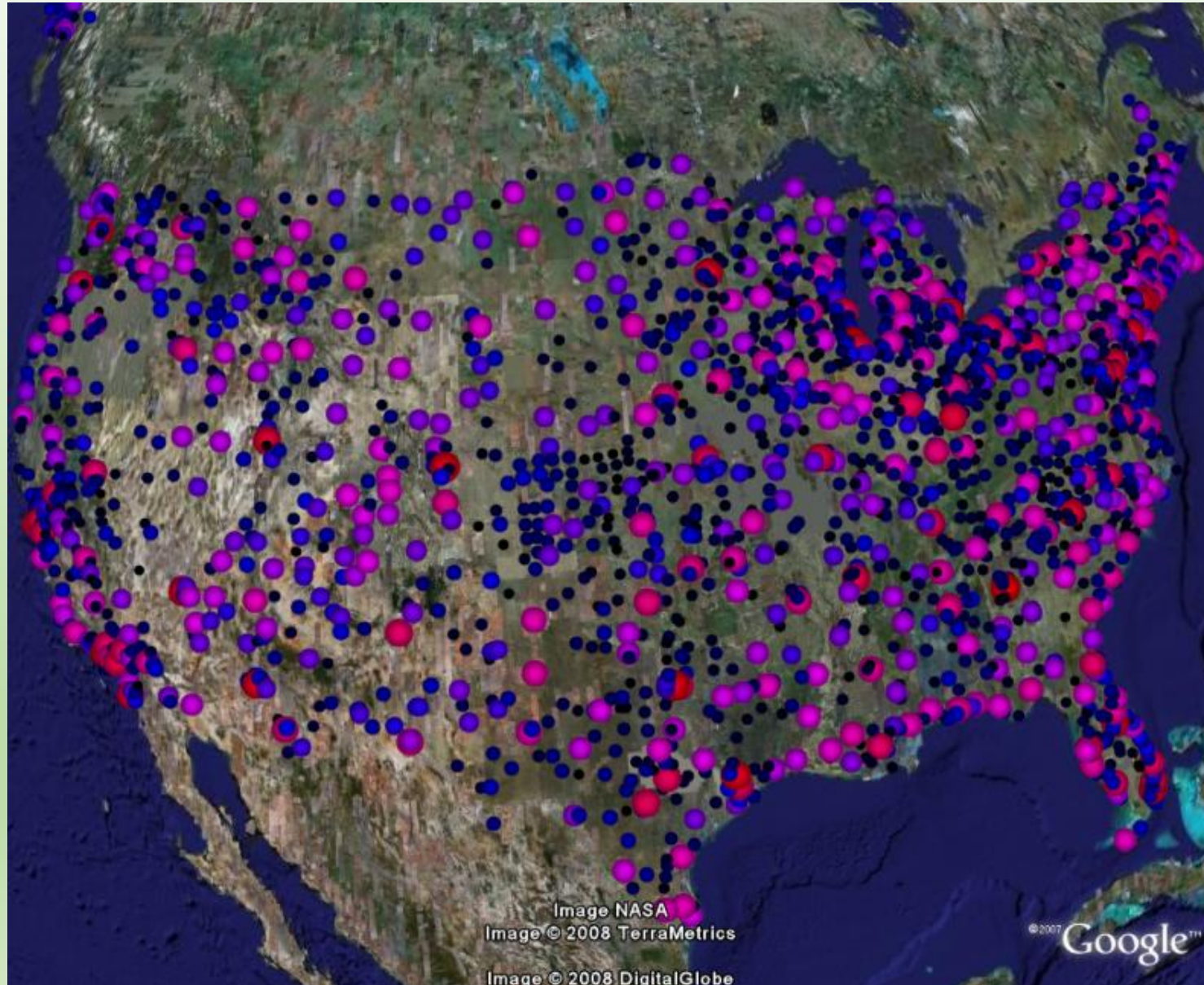
- **FAA Advisory Circular 150/5210-6D**

- “firefighting foam for aircraft is currently required to meet the millspec....”

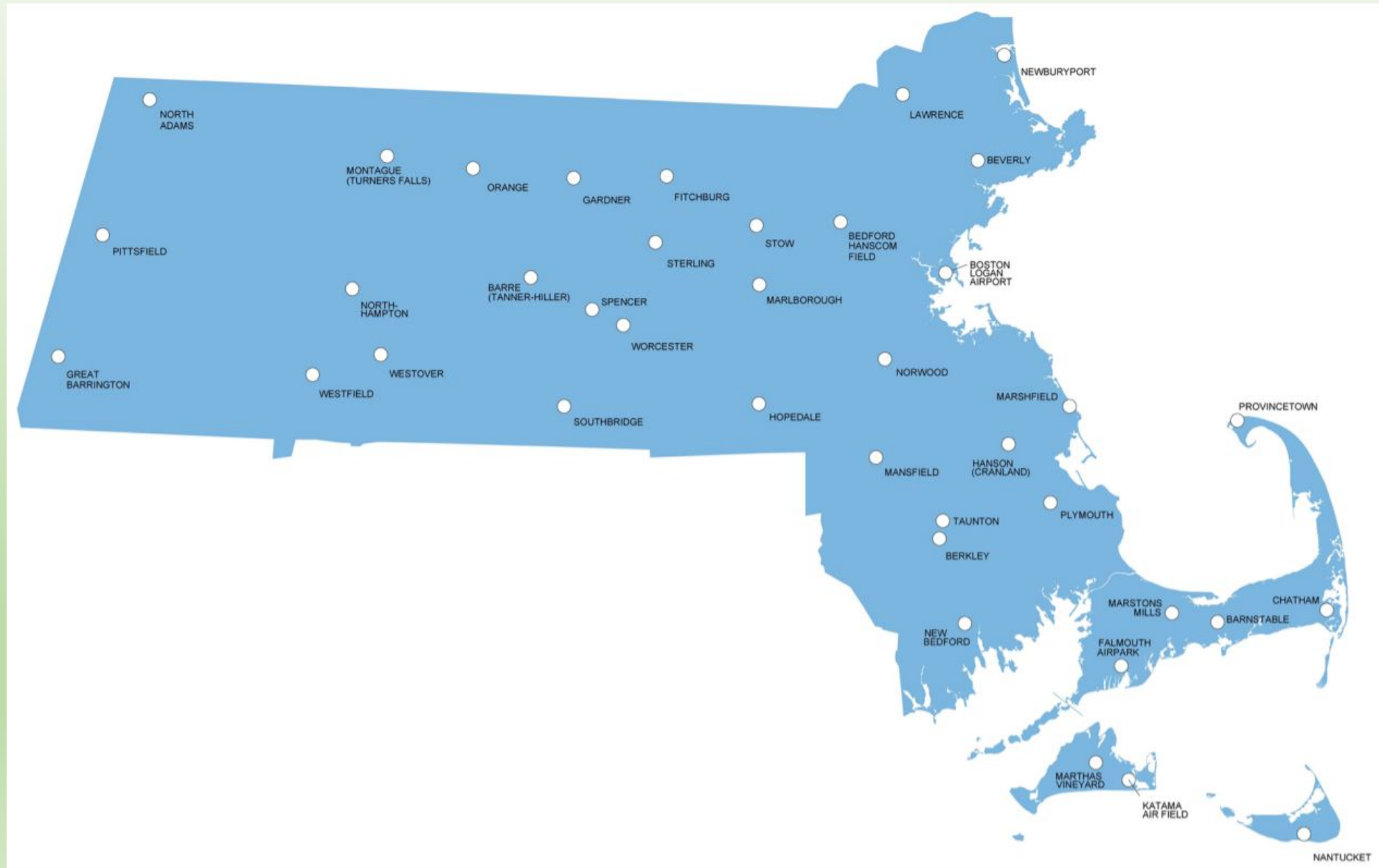
- **H.R. 4 – FAA Reauthorization Act of 2018, Sec 203**

- “...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 gear 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.

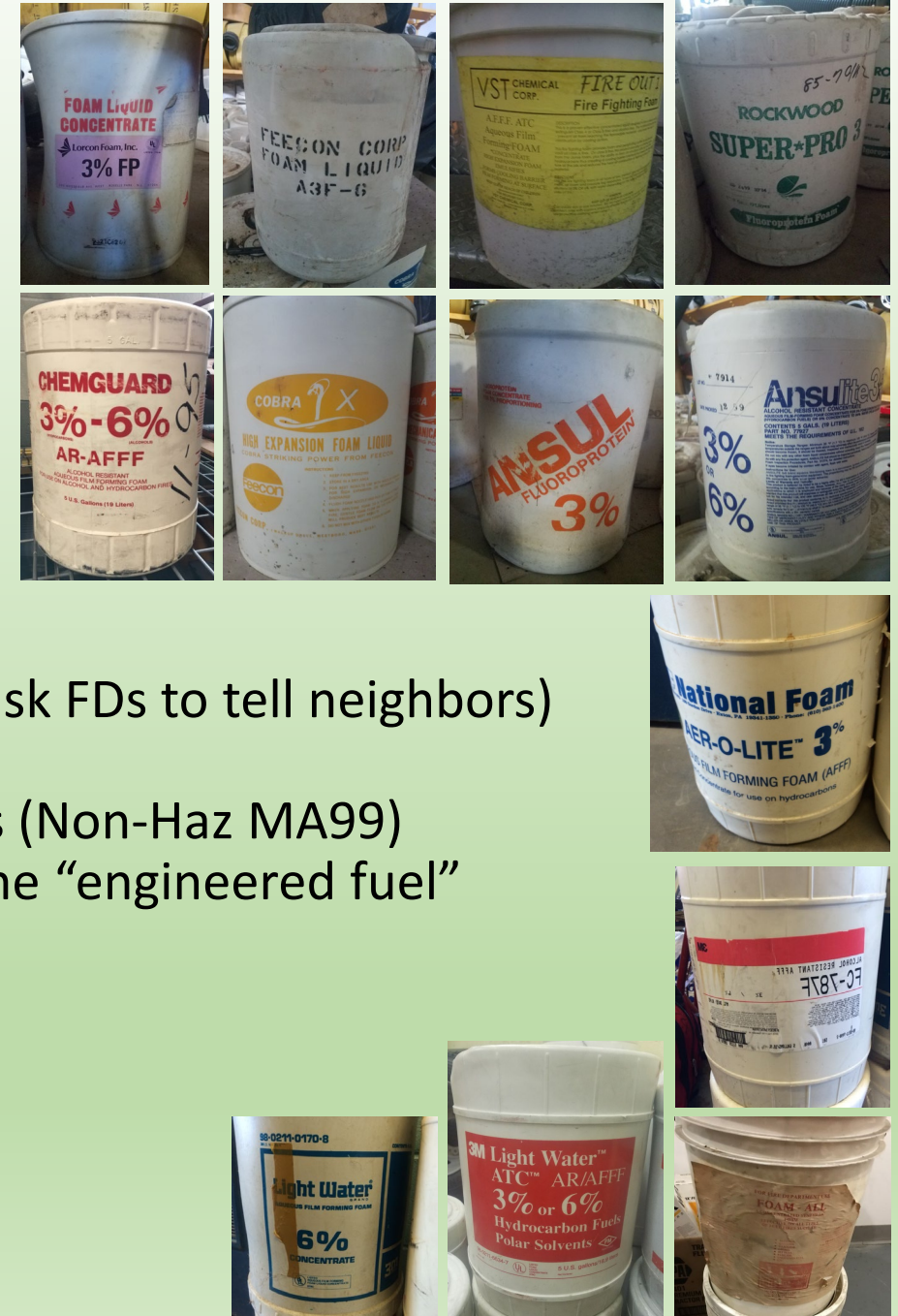
Massachusetts DEP Project

- **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)



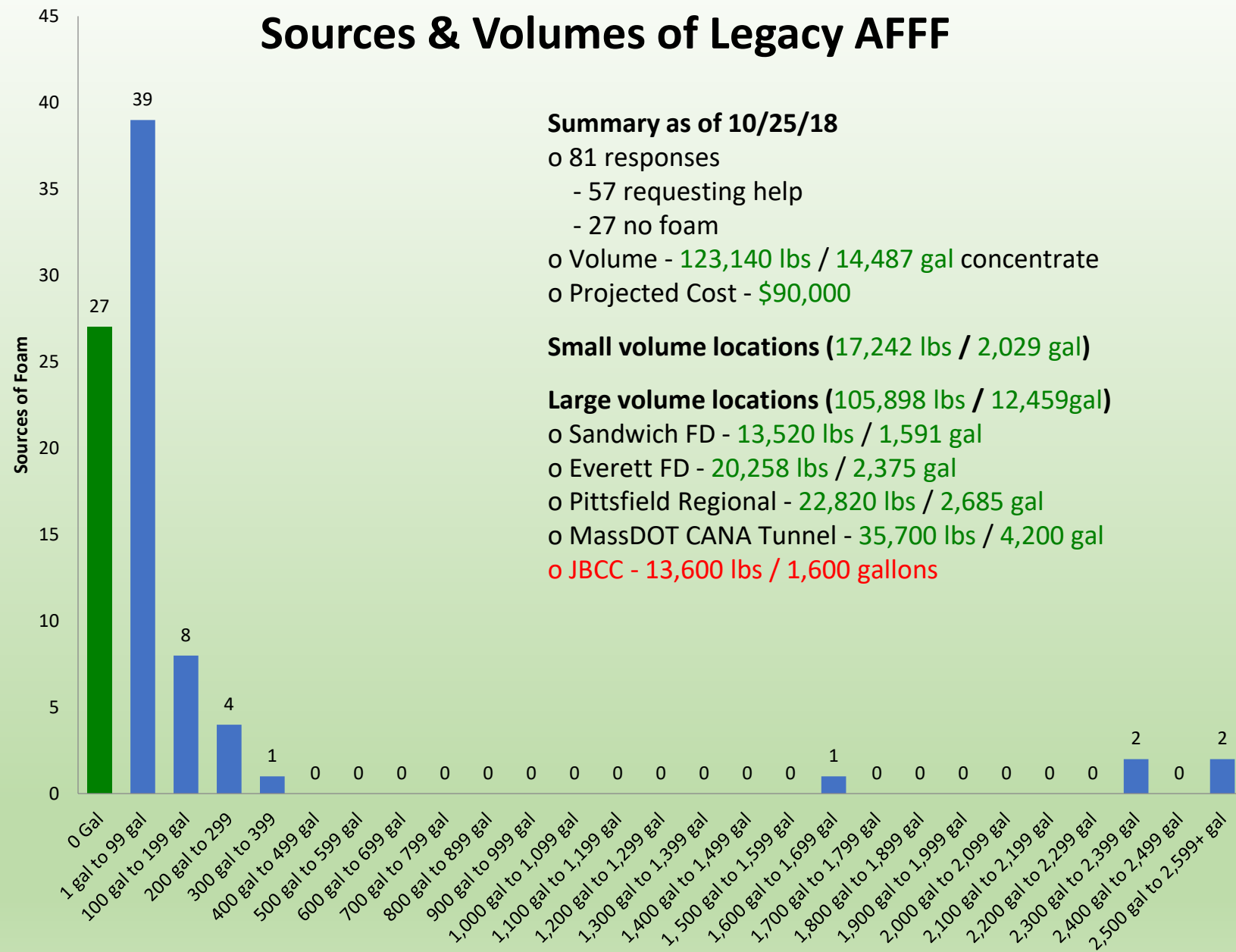
Massachusetts Participants with legacy foam

- 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

- o 81 responses
 - 57 requesting help
 - 27 no foam
- o Volume - 123,140 lbs / 14,487 gal concentrate
- o Projected Cost - \$90,000

Small volume locations (17,242 lbs / 2,029 gal)

Large volume locations (105,898 lbs / 12,459gal)

- o Sandwich FD - 13,520 lbs / 1,591 gal
- o Everett FD - 20,258 lbs / 2,375 gal
- o Pittsfield Regional - 22,820 lbs / 2,685 gal
- o MassDOT CANA Tunnel - 35,700 lbs / 4,200 gal
- o 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

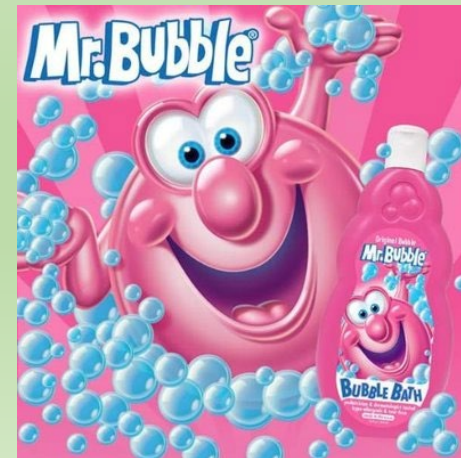
Massachusetts Lessons Learned/ Reinforced

- 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
 - Vsfofum – Silvara
 - BioEx – Ecopol
 - Fomtec – Environ 3x3 Plus
 - Solberg – Rehealing Foam RF6/RF3
 - BioSafety Tech – Trident
 - 3F – FreforSF, Hyfex, Freedol SF



Questions?

Matt Franklin
New York Dept. of Environmental Conservation
Albany NY
Matt.Franklin@DEC.NY.Gov

Nick Child MA
Massachusetts Dept. of Environmental Protection
1 Winter Street,
Boston MA 02108
Nick.Child@Mass.Gov
Office (617) 574-6847 Cell (508) 965-6318