

The background of the slide is a light gray gradient with several realistic water droplets of various sizes scattered across it. The droplets have highlights and shadows, giving them a three-dimensional appearance. The main title is centered in the middle of the slide.

PFAS IN THE NORTHEAST: A BRIEF OVERVIEW

JENNIFER GRIFFITH

NEWMOA

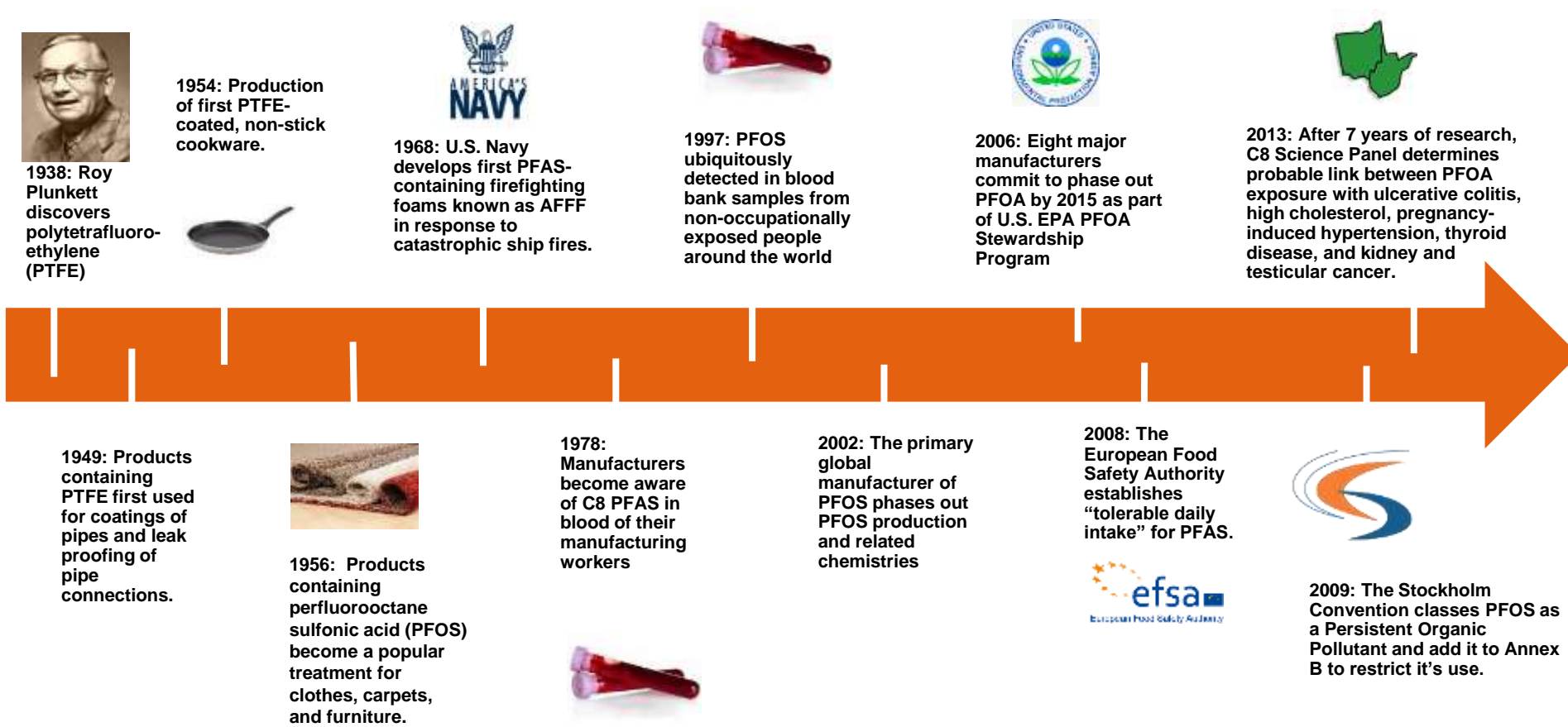
JUNE 15, 2017

WHAT ARE PFAS?

• POLY- AND PERFLUOROALKYL SUBSTANCES (PFAS)

- Carbon-Fluorine (C-F) bond is strongest chemical bond
 - ✓ Poly = partially fluorinated (all C is not bound to F)
 - ✓ Per = fully fluorinated
 - Chemically & thermally stable & hydrophobic/lipophobic = super difficult to break down
 - More carbon atoms = more difficult (referred to as “C6”, “C8”, “C12”,...)
- PFAS Includes: perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS) – both are “C8”
 - ✓ And hundreds (thousands?) of other compounds
 - Including “precursors” – “poly” compounds that can transform into “per” compounds

Historical Perspective on PFAS



Recent Acceleration of Attention on PFAS

2015: Phase-out of PFOA completed by eight leading manufacturers as part of US EPA Stewardship Council.



May 2015: Hundreds of prominent scientists and professionals sign on to the Madrid Statement, urging a complete move away from PFAS chemistry.

Perspectives Brief Communication

The Madrid Statement on Poly- and Perfluoroalkyl Substances (PFASs)

<https://www.epa.gov/10-1-2015/10-1-2015-statement>

January 2016: Manufacturing facility in Hoosick Falls, NY named first PFAS-related Superfund site for PFOA-contaminated drinking water



June 2, 2016: 100k Alabama residents advised not to drink their local drinking water

2015: U.S. EPA UCMR3 sampling of public drinking water finds PFAS in 97 public drinking water supplies.



October 2015: A manufacturer was found liable for a woman's kidney cancer in its first of 3500 personal lawsuits related to PFOA contamination of drinking water near a manufacturing facility in Parkersburg, WV.

February 2016: Guernsey, a Channel Island, loses lawsuit against a manufacturer in pursuit of costs related to cleanup of PFOS-contaminated groundwater and soil.



May 2016: US EPA announces drinking water health advisory limit for PFOS and PFOA (separately or combined) at 70 ppt (ng/L)



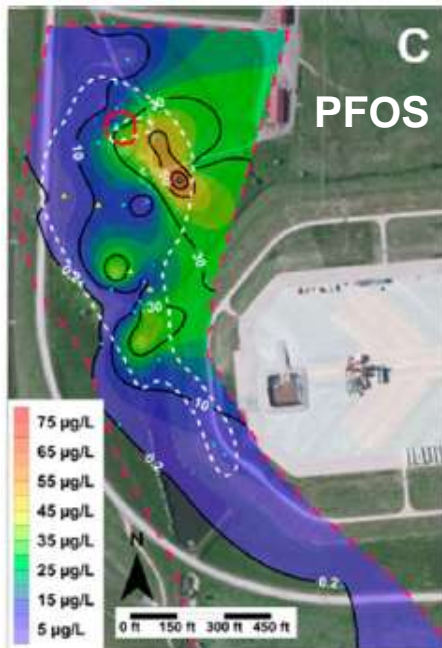
PFAS USES & SOURCES (slide courtesy of Dr. Guelfo, Brown University)

AFFF manufacturers:

- 3M before 2002
- Chemguard
- Ansul
- National Foam
- Angus
- Solberg
- Buckeye

AFFF end users:

- Department of Defense
- Airports
- Fire stations
- Fire training areas
- Petroleum (NAICS 324)



Source zone examples:¹⁴⁻¹⁶

- Ellsworth AFB, SD
- Tyndall AFB, FL
- Wurtsmith AFB, SD

14. McGuire, Meghan E., et al. "Evidence of remediation-induced alteration of subsurface poly- and perfluoroalkyl substance (PFAS) distribution at a former firefighter training area." (2014).
15. Moody, Cheryl A., et al. "Occurrence and persistence of perfluorooctanesulfonate and other perfluorinated surfactants in groundwater at a fire-training area at Wurtsmith Air Force Base, Michigan, USA." *Journal of Environmental Monitoring* 5.2 (2003): 341-345.
16. Schultz, Melissa M., et al. "Quantitative determination of fluorotelomer sulfonates in groundwater by LC MS/MS." *Environmental science & technology* 38.6 (2004): 1828-1835.

PFAS USES & SOURCES (slide courtesy of Dr. Guelfo, Brown University)

Other manufacturing: Miscellaneous

Electroplating (NAICS 332)

- PFOS used as mist suppressant

Paper

- PFAS used as grease/water repellent

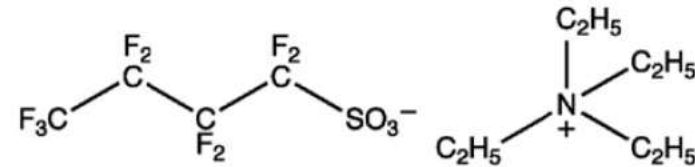
Textiles (NAICS 313), carpets (NAICS 314, 561), furnishings (NAICS 423)

- Stain-resistant coatings
- Waterproof coatings

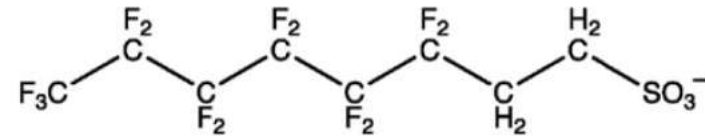
Plus other uses too numerous to list

Electroplating replacement PFAS⁸

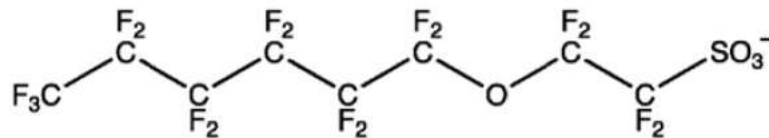
N(Et)₄-PFBS (CAS No. 25628-08-4)



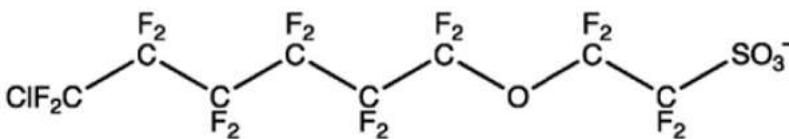
6:2 FTSA (CAS No. 27619-97-2)



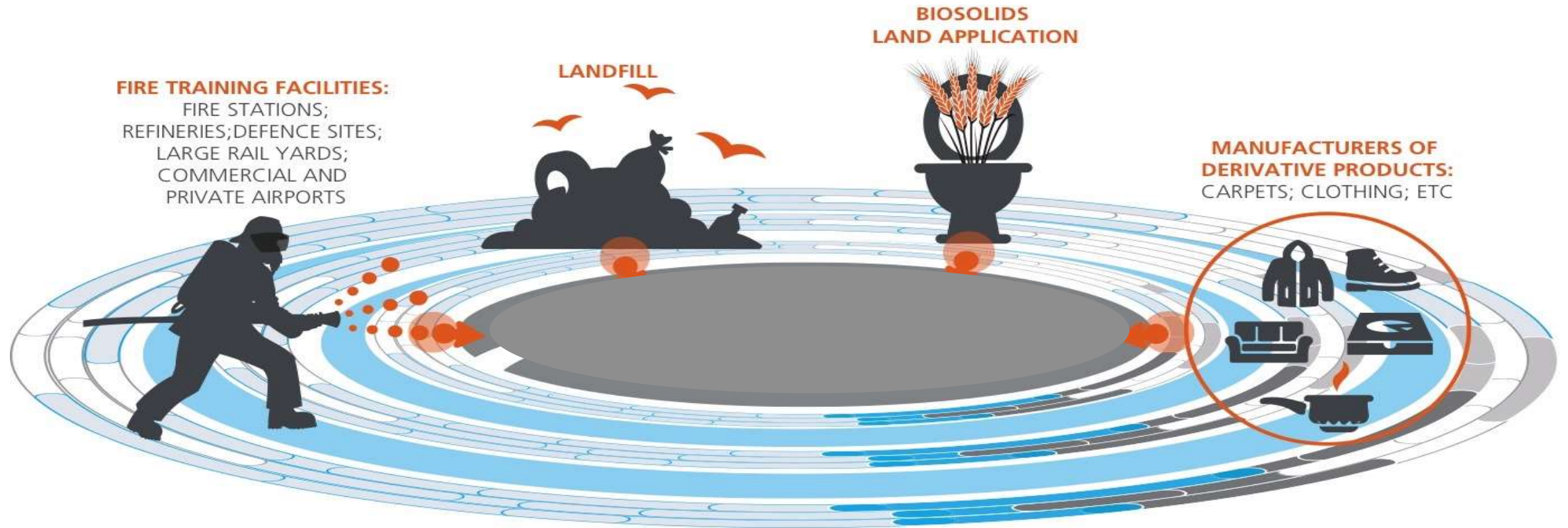
F-53 (CAS No. 754925-54-7)



F-53B (CAS No. 73606-19-6)

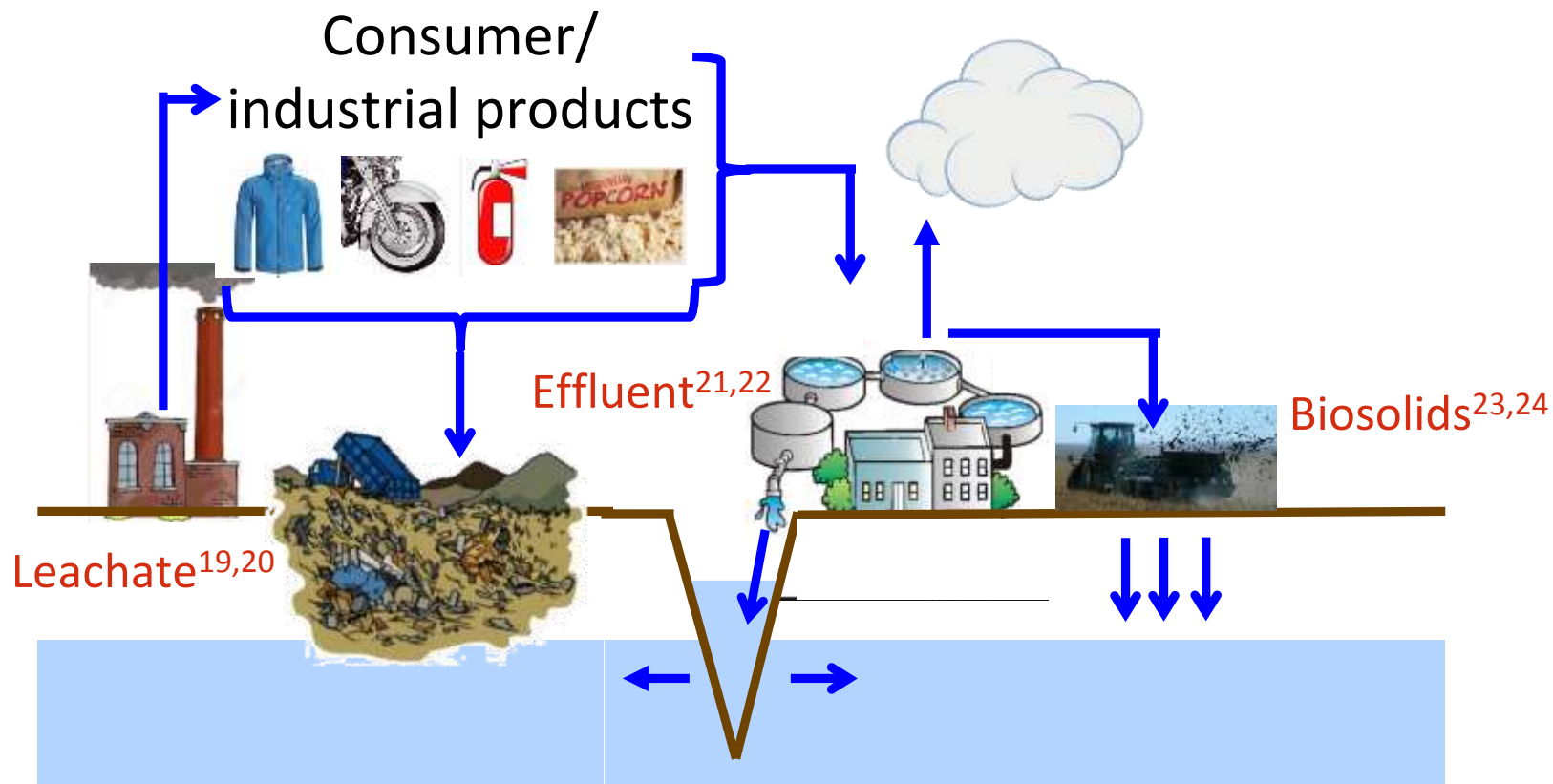


Major Sources of PFAS Contamination



PFAS USES & SOURCES (slide courtesy of Dr. Guelfo, Brown University)

Other sources: WWTPs, biosolids, landfills



Considerations

- PFAS occur in industrially- and municipally- sourced waste streams
- Target PFAS will vary based on waste received

NEWMOA STATE EXPERIENCE

- High profile sites in NH, NY, and VT
 - ✓ St Gobain: manufacturer of coated fabrics and plastics (a user of PFAS)
 - ✓ Also DOD firefighting-related sites & others
- ME, MA, and NJ have established sites
 - ✓ Mainly DOD sites
 - ✓ Manufacturers of PFAS in NJ
- VERY generally:
 - ✓ AFFF = PFOS & released in defined area
 - ✓ Uses in manufacturing = PFOA & can include soil/groundwater contamination from air deposition

PFAS REGULATION, SAMPLING & ANALYSIS (slide courtesy of Dr. Guelfo, Brown University)



Drinking Water Health Advisories for PFOA, PFOS
 70 ng/L: individually or in combination

State	Drinking Water	Other Matrices?	Which?
Connecticut	70 ng/L Σ PFOA, PFOS, PFNA, PFHxS, PFHpA	Yes	Soil, groundwater
Maine	70 ng/L Σ PFOA, PFOS ¹	Yes ¹	Soil, sediment, groundwater, surface water, fish
Massachusetts	70 ng/L Σ PFOA, PFOS	No	NA
New Hampshire	70 ng/L Σ PFOA, PFOS	Yes	Soil
New Jersey	40 ng/L PFOA ² 10 ng/L PFNA ²	No	NA
New York	70 ng/L Σ PFOA, PFOS ³	No	NA
Rhode Island	70 ng/L Σ PFOA, PFOS	No	NA
Vermont	20 ng/L Σ PFOA, PFOS	Yes	Soil

1.Guidelines (not standards)

2.Standard under review

3.Other PFASs may be considered if Σ PFOA,PFOS is slightly less than 70 ng/L

PFAS REGULATION, SAMPLING & ANALYSIS (slide courtesy of Dr. Guelfo, Brown University)

State	Drinking Water	Soil	Ground- and Surface water	Target PFAS
CT	EPA 537	ASTM D-7968-14	ASTM D7979-15	No set list (more is better)
ME	EPA 537	EPA 537	EPA 537	26 PFAS (list not provided)
MA	EPA 537 or other approved method	NA	NA	UCMR 3
NH	DoD/NELAP certified lab or EPA 537	DoD/NELAP certified lab	DoD/NELAP certified lab	PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFNA, PFBS, PFHxS, PFOS
NJ	EPA 537 ¹	NA	NA	PFHxA, PFHpA, PFOA, PFNA, PFDA, PFUnA, PFDoA, PFTrDA, PFTA, PFBS, PFHxS, PFOS
NY	EPA 537 (past) ISO 25101 (now)	NA	NA	UCMR 3 + others depending on lab
RI	EPA 537	NA	NA	See New Hampshire
VT	EPA 537	EPA 537		UCMR 3 required, 12 usually reported

DoD = Department of Defense NELAP = National Environmental Laboratory Accreditation Program

¹-At NJDEP-certified lab with RL ≤ 6ng/L for PFOA and ≤ 10 ng/L for all other PFASs

WHAT IS NEWMOA DOING?

- Regional States/EPA Meeting: May 2016
- Monthly States/EPA Conference Calls: Ongoing
- Five-part Webinar Series: August – December 2016
- PFAS Workshops for Regulators, Consultants, & Others: May 2017
- Information & Presentations at:

www.newmoa.org/cleanup/projects/pfas.cfm

✓ Includes links to PFAS websites in states, EPA, Navy, ITRC & ASTSWMO

QUESTIONS?

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