PFAS Considerations for Wastewater Professionals

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NEWEA
WORKING FOR WATER QUALITY

25th Anniversary 1997–2022
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North East Biosolids & Residuals Association

Pace

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PFAS OVERVIEW

- SOURCES & RECEIVERS
- TEST METHODS
- REGULATORY UPDATE
- FIELD SAMPLING & RESOURCES
- TAKEAWAYS

WHAT ARE PFAS?

A large, diverse group of manufactured compounds that have been used for decades in industries and hundreds of industrial applications and consumer products.

- Oil/Water/Grease properties
- Entirely man-made
- Bioaccumulative
- Hydrophilic
- Have documented health impacts

AEROSPACE

AUTOMOTIVE

APPAREL & TEXTILES

FOOD PACKAGING

FIRE-FIGHTING FOAMS

NON-STICK COATINGS/ COOKWARE

WIRE

CARPETING

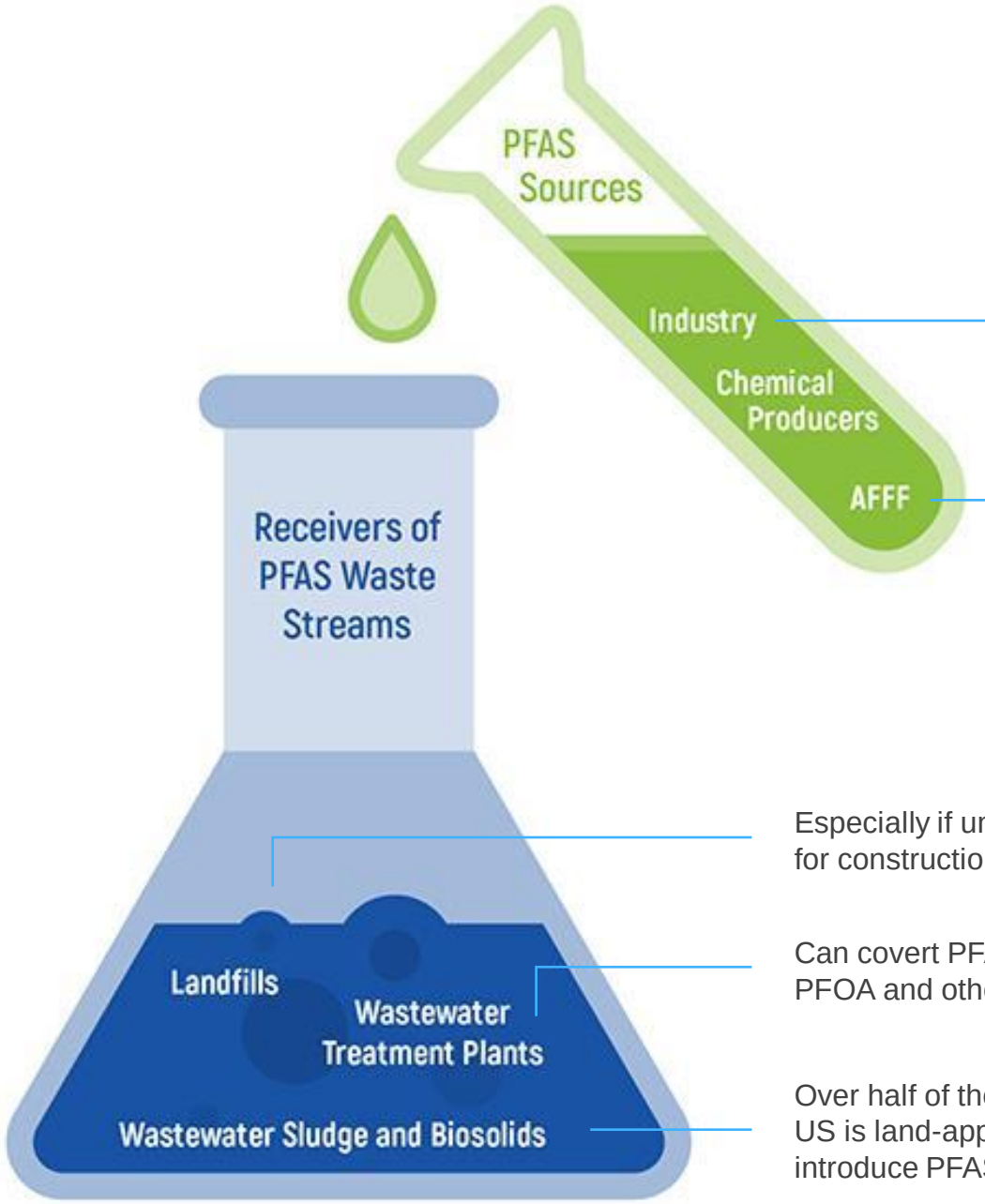
METAL PLATING

THE PFAS PUZZLE

- Lack of federal regulation
- Non-uniformity of state regulations or test methods
- Lack of environmental test methods
- Variety of compound lists
- Thousands of PFAS compounds
- Low DLs vs. contaminated matrices
- Ultra restrictive field sampling guidance

THE PFAS LIFECYCLE

- Industry is the most common source of PFAS contamination - both the manufacturers of PFAS chemicals and those that use them in the products they make.
- PFAS do not degrade naturally, chemicals can remain in the surrounding soil for decades.



- Textile manufacturing
- Certain paper food wrapping
- Metal plating & etching
- Wire manufacturing
- Pesticides
- Personal care products
- Non-stick cookware

Department of Defense and other users of AFFF (Aqueous film forming foam)

Especially if unlined, such as those used for construction and demolition debris

Can covert PFAS precursors into PFOA and other PFAAs

Over half of the sludge produced in the US is land-applied as biosolids and may introduce PFAS into the food chain

PFAS IN WWTP BIOSOLIDS

- PFAS have been found in domestic sewage sludge
- More than half of the sludge produced in the United States is applied to agricultural land as biosolids
- Application of biosolids as a soil amendment can result in a transfer of PFAS to soil
- PFAS can enter the food chain using biosolids-amended soil
- PFAS concentrations can be elevated in surface and groundwater in the vicinity of agricultural fields that received PFAS contaminated biosolids

Maine PFAS IN BIOSOLIDS

- Maine required all sludge to be screened (PFOA, PFOS, PFBS) starting in Mar 2019
- Maine developed PFAS screening level for beneficial use for sludge and sludge-derived compost intended for land application
- Introduced H.P. 1417 in Jan 2022 - Soil screening levels: PFOA 2.5 ng/g, PFOS 5.2 ng/g, and PFBS 1,900 ng/g
- L.D. 1911 signed into law Apr 2022
- Ban on land application of sludge and sludge-derived compost from municipal, industrial, or commercial treatment plant

Source: https://www.maine.gov/dep/spills/topics/pfas/Maine-PFAS-Screening-Levels-Rev-6.28.21.pdf

Michigan PFAS IN BIOSOLIDS

- Michigan EGLE - Required PFAS Sampling Prior to Land Application each year if land applying Apr 2022
  - PFOS ≥ 125 µg/kg - Biosolids are deemed to be industrially impacted and cannot be land applied
  - PFOS 50 -125 µg/kg - immediately notify EGLE, WRD staff, investigate sources, reduce land application to less than 1.5 dry tons/acre
  - PFOS 20 - 50 µg/kg - EGLE recommends investigating sources, increased monitoring (annually)
  - PFOS ≤ 20 µg/kg – may land apply, communicate with landowners/farmers

Source: https://www.michigan.gov/egle/-/media/Project/Websites/egle/Documents/Programs/WRD/Biosolids/PFAS-Biosolids-Interim-Strategy-2022.pdf

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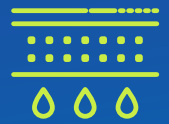
PUBLISHED EPA TEST METHODS

DRINKING WATER

CHARACTERISTIC	EPA 537.1	EPA 533
MATRIX	Drinking Water	Drinking Water
COMPOUNDS	18	25
HOLDING TIMES, DAYS	14/28	28/28
EXTRACTION	Solid Phase (SPE)	Solid Phase (SPE)
QUANTIFICATION	Internal Standard (IS)	Isotope Dilution (ID)
NOTES		Developed for UCMR 5 and additional PFAS. **Does not replace 537.1.**

TEST METHODS



NON-POTABLE WATERS & LEACHATE

SOIL & OTHER SOLIDS

BIOTA – PLANT & ANIMAL TISSUE

CHARACTERISTIC	PFAS BY ID/"537M"	SW-846 8327	OW 1633 - Draft	SW-846 8328 (under development)
MATRIX	All matrices	Non-potable water	Non-potable water, solids, biota	Non-potable water, solids, biota
COMPOUNDS	40	24	40	40
HOLDING TIMES, DAYS	28/28	14/30	28	TBD
EXTRACTION	Solid Phase (SPE)	Direct Injection	Solid Phase (SPE)	Solid Phase (SPE)
QUANTIFICATION	Isotope Dilution (ID)	External Standard	Isotope Dilution (ID)	Isotope Dilution (ID)
NOTES	Labs required to modify 537, DoD QSM B-15 or other methods as 537/533 are prescriptive methods	Limited use, screening method, 14 compounds present QC challenges	Currently in multi-lab validation step with final method in 2022-2023	Currently in multi-lab validation step with final method in 2022-2023

TEST METHODS

NON-POTABLE WATERS & LEACHATE

SOIL& OTHER SOLIDS

CHARACTERISTIC	True-TOF®	AOF (Draft Method 1621)	TOP ASSAY
MATRIX	Non-potable Water	Non-potable Water, Solids*	Non-potable Water, Solids
COMPOUNDS	1 (total)	1 (total)	Up to 40
HOLDING TIMES, DAYS	28	28	28/28
EXTRACTION	None	GAC (“adsorption”)	Solid Phase (SPE)
QUANTIFICATION	External standard	External standard	Isotope Dilution (ID)
NOTES		Method quantifies total of all organofluorine compounds	Method quantifies total of all PFAS precursor chemicals

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REGULATORY UPDATE: FEDERAL

- PFAS Strategic Roadmap: EPA's Commitments to Action 2021-2024
- Whole-of-agency approach
- Set timelines for specific actions and establishing new policies
- EPA Goals
  - Research – invest in research, development, innovation
  - Restrict – prevent PFAS from entering air, land, water
  - Remediate – clean up contamination, human and ecological health

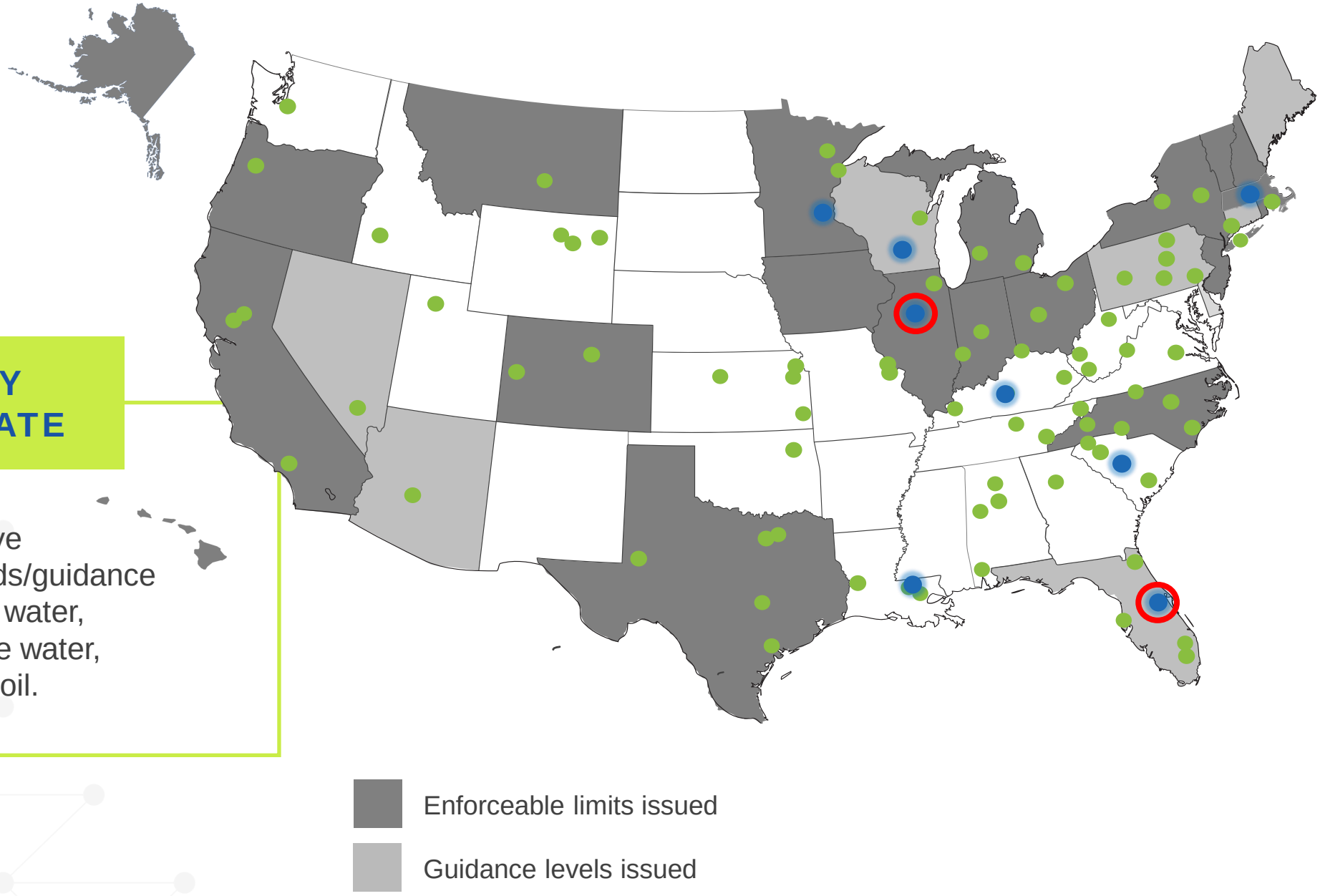
Source: https://www.epa.gov/pfas/pfas-strategic-roadmap-epas-commitments-action-2021-2024

REGULATORY UPDATE: FEDERAL

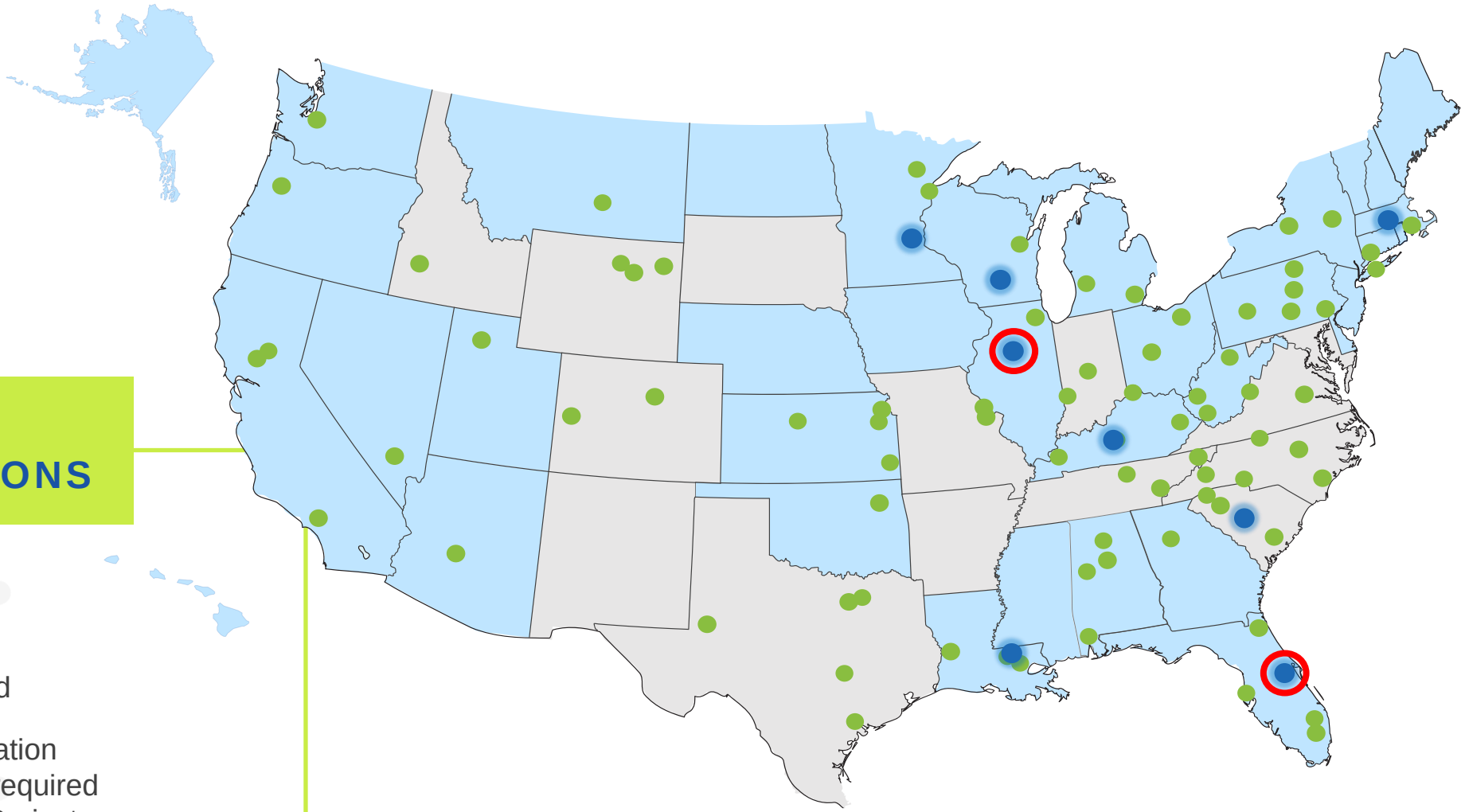
- Restrict discharge on industrial releases of PFAS, NPDES (Winter 2022)
- Enhanced reporting under Toxics Release Inventory (TRI) (Spring 2022) ✓
- Restrict PFAS discharges from industry through Effluent Limitations Guidelines (ELGs) (2022, ongoing)
- Finalize risk assessment for PFOA/PFOS in biosolids (Winter 2024)
- Propose rule - PFAS as hazardous substances (Spring 2022) ✓

REGULATORY UPDATE: STATE

So far, 30 states have established standards/guidance for PFAS in drinking water, groundwater, surface water, wastewater and/or soil.



PFAS CERTIFICATIONS



PFAS Certified

PFAS Certification not available/required for non-DoD Projects

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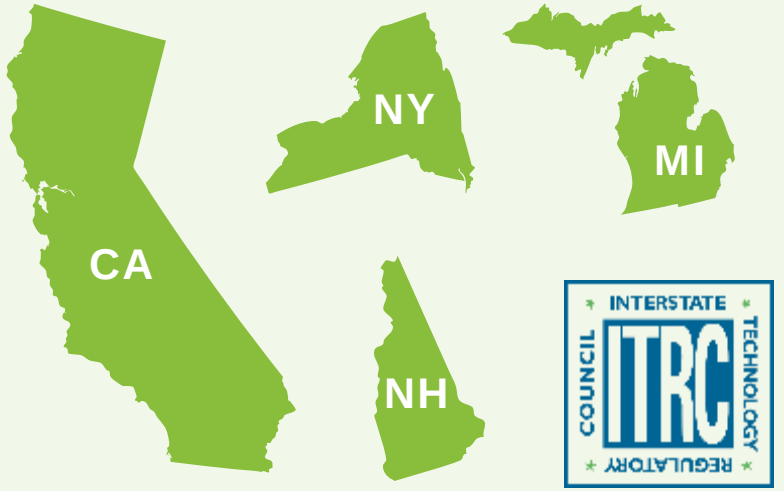
SAMPLING GUIDANCE

- Traditional sampling materials contain PFAS: clothing, sunscreen, bug repellant, footwear, sampling equipment, waterproof notebooks
- PFAS reporting limits – single digit ppt levels
- More potential for field sampling activity to cause sample contamination
- Take measures to limit sample to PFAS exposure in the field
- Field quality control samples have heightened importance



Numerous states and organizations have published stringent SOPs for drinking water, non-potable water, and soil

links available at the Pace PFAS webpage

Clothing and Hygiene

- No clothing or boots containing Gore-Tex™
- Safety boots must be made from polyurethane or PVC
- No materials containing Tyvek®
- Do not use fabric softener on clothing to be worn in field
- Do not use cosmetics, moisturizers, hand cream, or other related products the day of sampling
- Do not use unauthorized sunscreen or insect repellant
- Wet weather wear - made of polyurethane and PVC only
- Wash hands and put on powderless nitrile gloves
- No food or drink at the sampling site

FIELD QC SAMPLES

FIELD BLANK (FB)

meant to validate that field sampling activity did not cause sample contamination

EQUIPMENT/ RINSATE BLANK (EB)

meant to validate cleanliness of sampling equipment before sampling and between sampling points

TRIP BLANK (TB)

meant to validate that samples were not cross-contaminated in route to lab

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PACE IS YOUR WATER LABORATORY PARTNER

- PFAS are now well down the path to become regulated in wastewater – consider budgeting now
- Industrial dischargers contributing to POTW
- Biosolid and PFAS contamination
- Carefully consider your objectives for testing
- Field sampling – minimizing cross contamination is crucial
- Not all labs are created equal – regulated parameters and unregulated parameters like PFAS and UCMR
- Pace® Analytical is your source the most current information and truly full-service lab testing

THANK YOU AND QUESTIONS

Additional resources:

- PFAS.com
- PACELABS.COM | Search: PFAS

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