



Advanced
Environmental
Laboratories, Inc.

Science. Sustainability. Service.

ALL THINGS PFAS FROM COMPLIANCE TO CLEANUP

Evan Ged, PE
Operations Manager

PRESENTATION OUTLINE



Advanced
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01. Presenter Overview

02. What is PFAS?

03. PFAS Occurrence in Florida

04. Regulatory Status

05. PFAS Sampling & Analysis

06. Challenges and Keys to Success



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EXPERIENCE

15+ years

- Oversee daily production across 8 AEL Network laboratories.
- Expertise in water quality, treatment, and laboratory testing.
- Licensed PE in Texas and Arkansas
- B.S. in Environmental Engineering from NC State
- M.E. from the University of Florida
- Grew up alongside AEL as the company expanded into Florida's largest environmental laboratory network.

WHO IS AEL?

Florida's Largest Laboratory Network

- 8 Laboratory Locations Across Florida
- Founded in 1994 – 32 Year History
- Independently owned, Florida Based
- Headquartered in FL (Jacksonville)
- > 200 employees
- NELAP/TNI/DOD-ELAP Certified
- All analyses remain in the state of Florida
- Federal SBA registered Small Business Enterprise “Nation’s Largest Small Business Laboratory”



- Jacksonville HQ
- Tampa
- Miami
- Orlando
- Tallahassee
- Fort Myers
- Gainesville
- Lake Placid



WHAT IS PFAS?

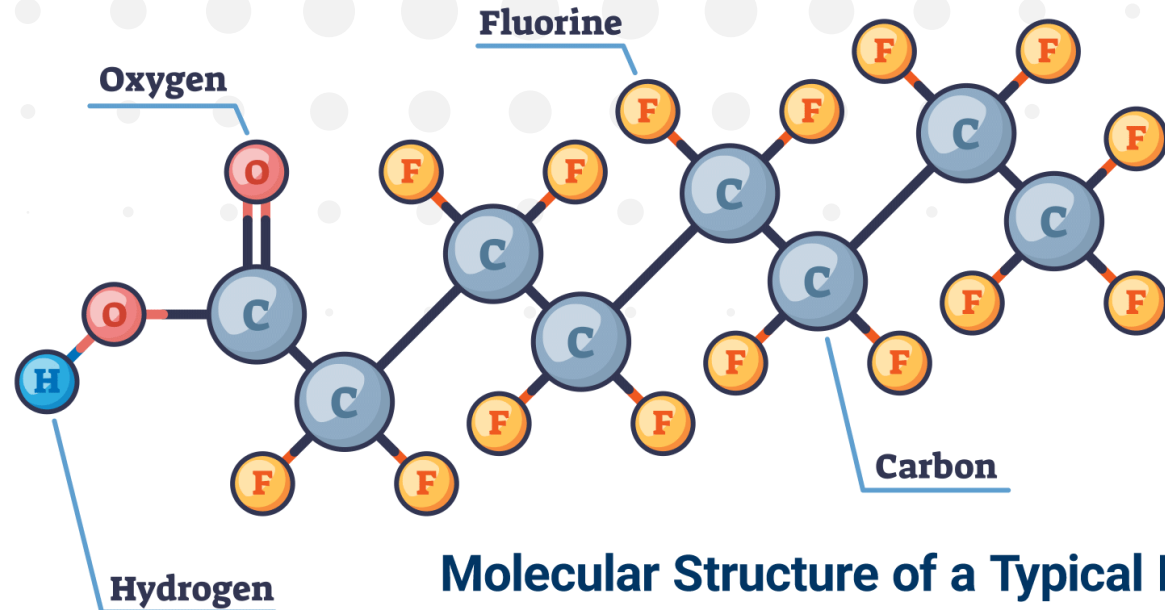
WHAT THEY ARE

PFAS, or per- and polyfluoroalkyl substances, are a large family of thousands of synthetic chemicals with Carbon-Fluorine bonds.

WHY THEY'RE TOUGH

This bond is one of the strongest in organic chemistry, making PFAS extremely resistant to heat, water, and chemical breakdown.

PFAS | Per- and Polyfluoroalkyl Substances





WHAT IS PFAS?

WHERE THEY'RE USED

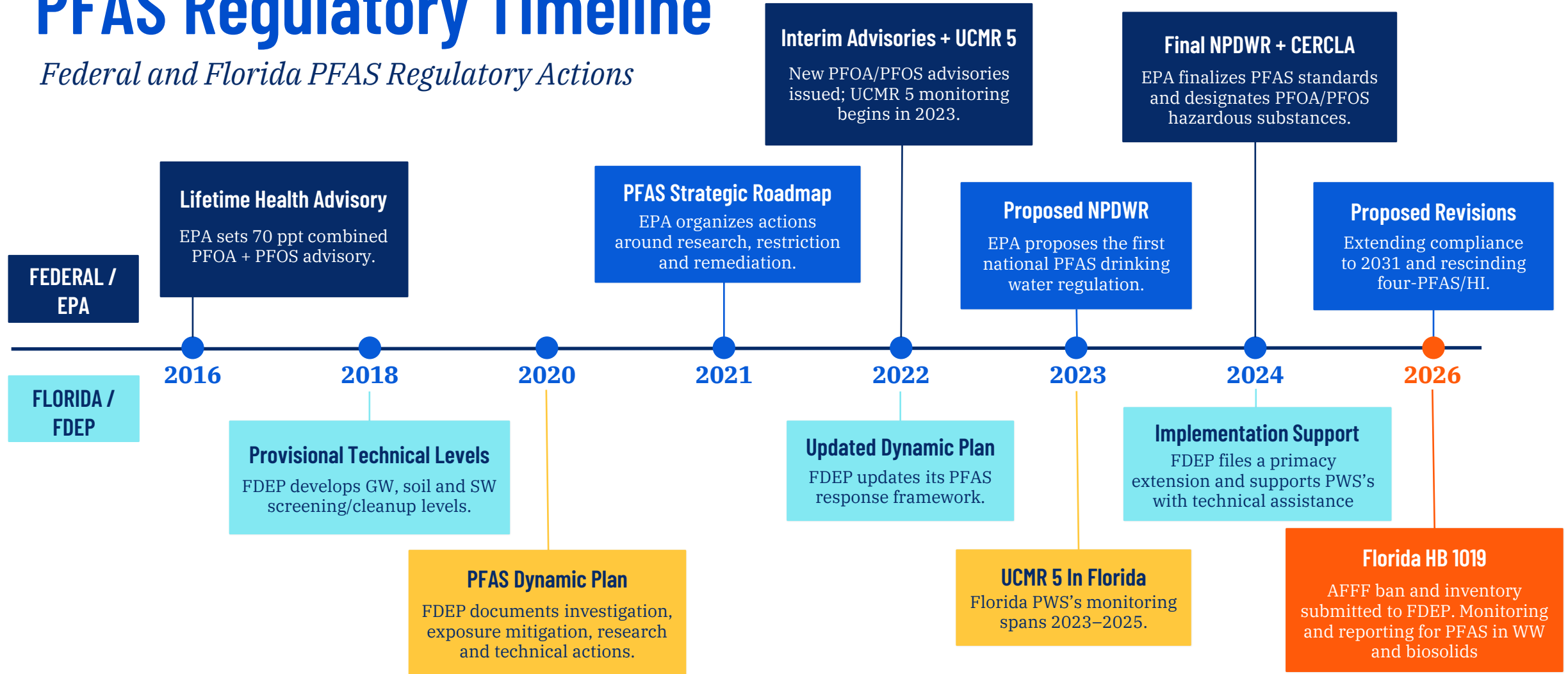
Because of this durability, PFAS are widely used in products like nonstick cookware, firefighting foams, and water-resistant coatings.

WHY THEY PERSIST

They now persist in the environment and human body, earning the nickname “forever chemicals.” And a subset is now included in environmental regulations.

PFAS Regulatory Timeline

Federal and Florida PFAS Regulatory Actions



KEY TAKEAWAY

Federal actions establish national monitoring, drinking-water and cleanup frameworks. Florida translates those frameworks into investigation, technical assistance, site controls and utility implementation.

Florida's PFAS Response: Investigate, Reduce Exposure, and Prepare Systems

FDEP's approach spans contaminated site cleanup, source control, technical criteria, and drinking water implementation. Baseline occurrence data was collected under UCMR 5.

UCMR 5 Occurrence Baseline

● **414**
Florida PWS
Participated

● **2023-25**
Monitoring Window

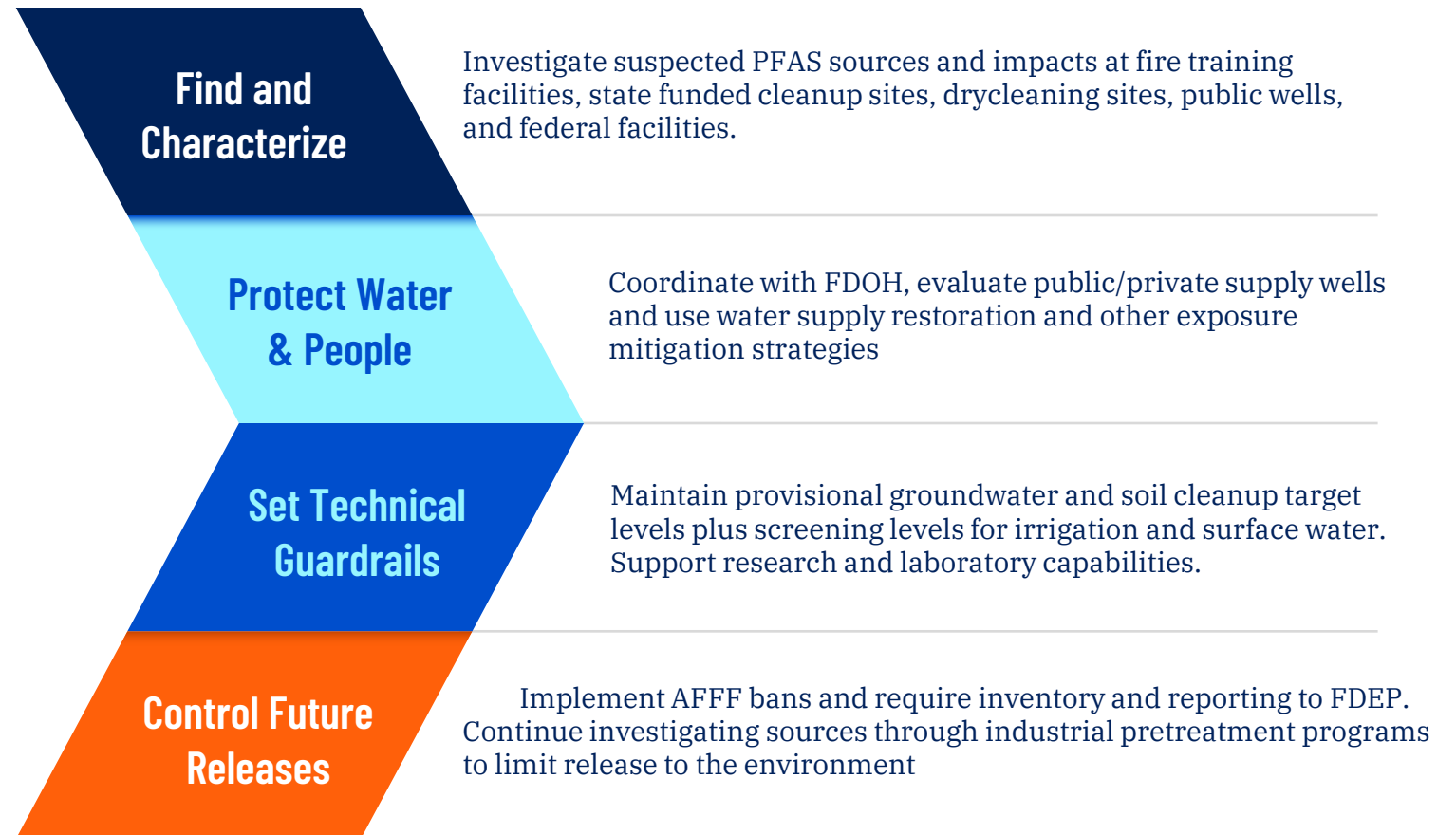
● **29**
PFAS Monitored

● **4.3%**
Results above MRL

UCMR 6 Proposed Monitoring

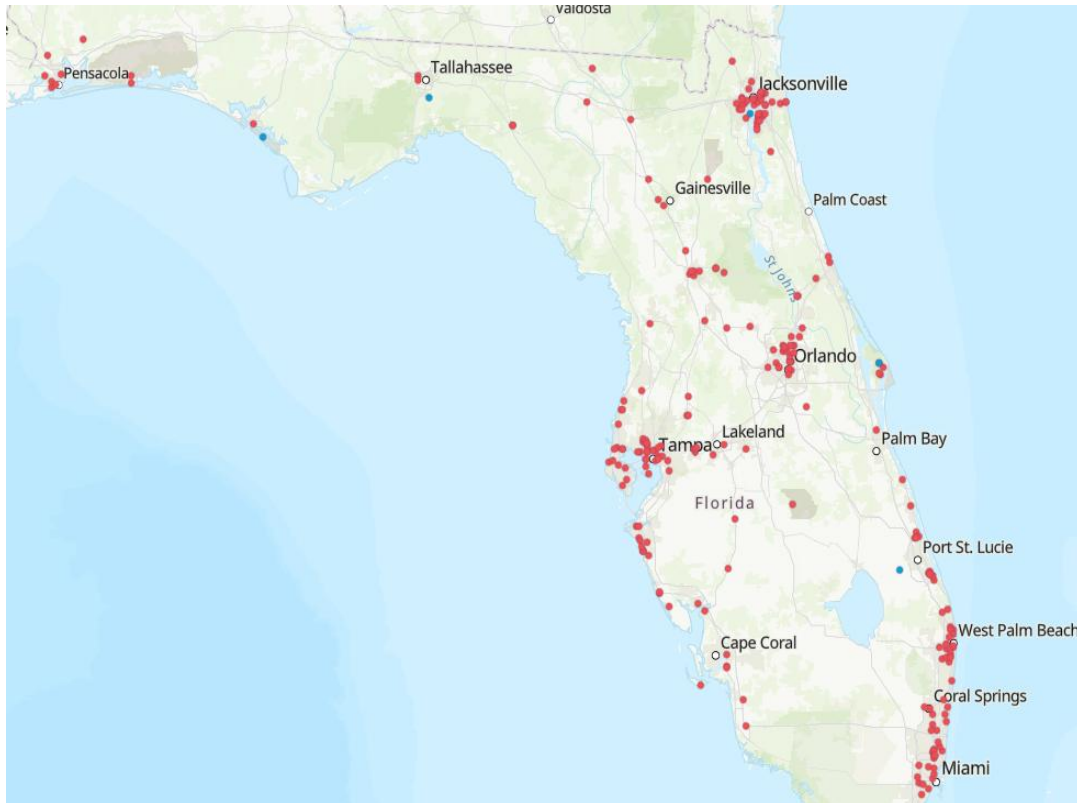
● **EPA 563**
7 Ultrashort-chain
PFAS Compounds

● **30**
Emerging
Contaminants

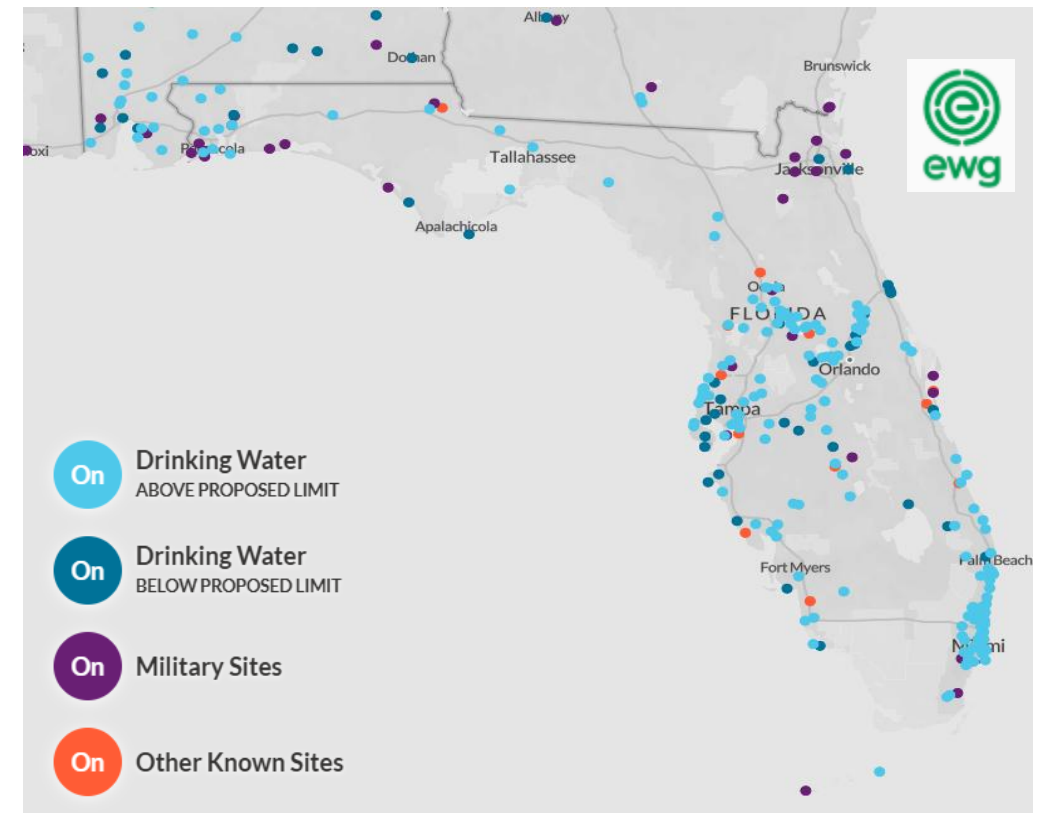


PFAS Across Florida's Geographic Landscape

FDEP Contaminated Sites Monitoring for PFAS – Groundwater & Soil



Drinking Water Dashboard



NPDWR | Monitoring Frequency

PFAS DRINKING WATER

System Type	System Size	Monitoring Frequency	EPA Method Required	Maximum Contaminant Level (MCL)
Surface Water	All sizes	4 Sampling Events in one year, 2-4 months apart	EPA 533 or EPA 537.1	PFOA = 4.0 PFOS = 4.0 HFPO-Da = 10 PFHxs = 10 PFNA = 10 Hazard Index = 1.0
Groundwater	Serving > 10K People	4 Sampling Events in one year, 2-4 months apart		
	Serving ≤ 10K People	4 Sampling Events in one year, 5-7 months apart		

** Methods require Field Blanks to be collected but only analyzed if PFAS are detected in the sample.*

- May be able to use UCMR 5 data for initial monitoring under the NPDWR.
- Initial monitoring must be submitted to FDEP by April 2027. PWS must meet MCLs by 2029 unless approved for 2031 extension.
- EPA established trigger levels at ½ the MCL.
- Results determine future compliance monitoring frequency.
- UCMR 6 announced 7/1/26 and will include 7 ultrashort chain PFAS by **EPA Method 563**. Monitoring is scheduled from 2028 – 2030.



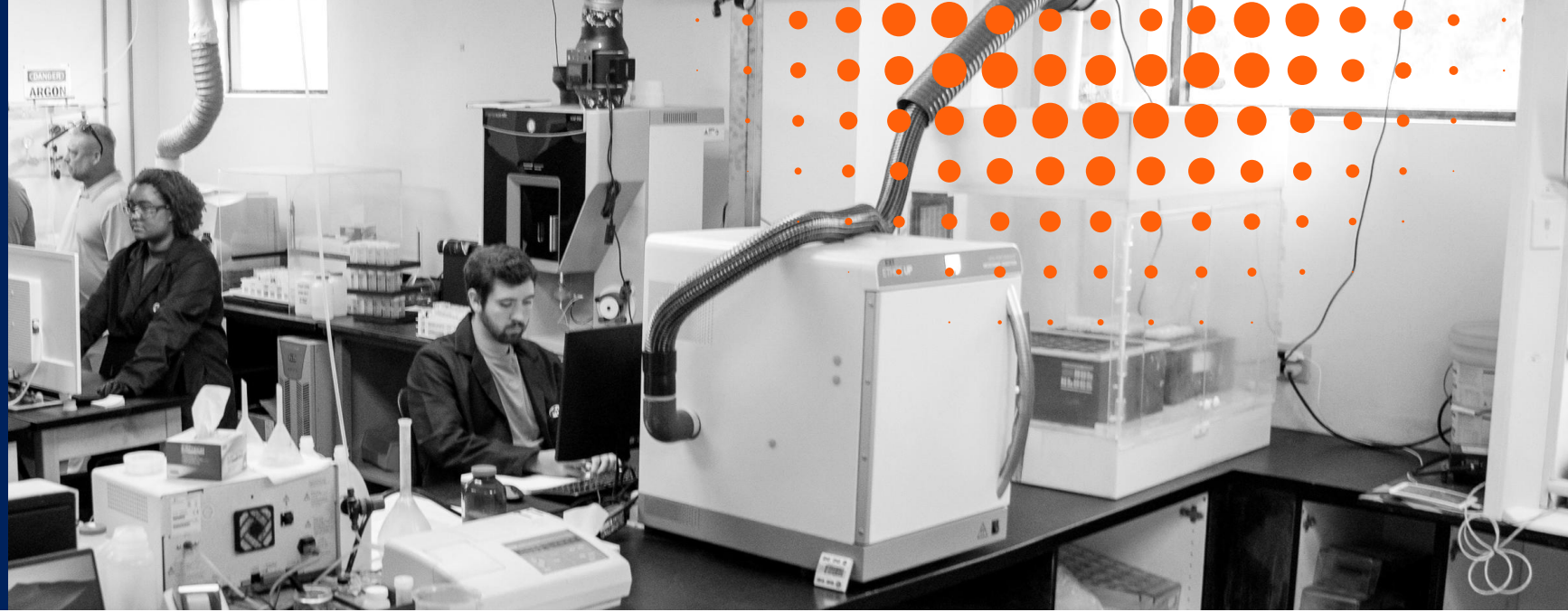
PFAS Wastewater & Biosolids

WHO MUST COMPLY

Regulated Entities	Public entities disposing of domestic wastewater biosolids and/or treated effluent.
Flow Threshold:	≥ 25,000 GPD designed avg. daily flow
Sampling Frequency	Quarterly, ≥1 sample event/quarter at representative sampling locations
Sample Types Required	• Treated WW effluent (final discharge) • Domestic wastewater biosolids (sewage sludge)
Minimum Analytes	FDEP currently requires the full 40-compound EPA Method 1633A PFAS list, including PFOA and PFOS
Submit Results To	The FDEP on the facility's DMRs in accordance with updated facility permit.

ENFORCEMENT STATUS: Informational only until EPA establishes PFAS water quality standards and FDEP adopts them. No numeric limits established, but sampling/reporting is required.

From Detection to Decision



The right PFAS test starts with the environmental question, not the instrument.

01. DEFINE

What decision must the data support?

02. DESIGN

Match matrix, method, and reporting limits

03. ACT

Translate defensible evidence into action

FROM THE LABORATORY PERSPECTIVE

PFAS decisions depend on sampling controls, transparent limitations, and reporting that preserves how the data were produced



Field Design

- Representative locations
- PFAS-aware sampling precautions
- Chain of custody
- Shipping and preservation



Laboratory Control

- Documented preparation and methods
- Rigorous QC
- Reporting limits and qualifiers
- Turnaround times
- People and capacity



Interpretation

- Method boundaries
- Matrix effects and uncertainty
- QC evaluation
- Lab to lab variability
- Regulatory limits keep moving



Reporting

- Preparation and analysis documented
- EDD/Data packages
- Clear case narratives
- Traceability based on reporting level



SAMPLING BEST PRACTICES

In the Field...

- No Teflon (tubing, bailers, cap liners)
- Low-flow sampling (turb < 10 NTU). PFAS can adsorb to TSS
- Field blanks, equipment blanks, duplicates, MS/MSDs (lab supplied PFAS free water)
- Avoid chemical ice packs (BlueIce)
- Check preservatives! If differs by method
- Several sources of PFAS from clothing, food packaging, and cosmetics
- In surface water, PFAS can be enriched near the surface (collect at 1' – 2' below)

PFAS Field Guide



PFAS Method Selection & Field Guide

CATEGORY	✓ DO USE	✗ DO NOT USE
Field Clothing	Cotton or natural fibers	Water-repellent, stain-resistant, or synthetic fabrics (Gore-Tex, Tyvek)
Sample Bottles	HDPE or Polypropylene - pre-cleaned & certified PFAS-free	Glass, Teflon, or fluoropolymer containers
Preservatives	Trizma® (537.1), Ammonium Acetate (533), pre-added by lab, cooled 6°C or less	Any field-added or unapproved preservative
Sample Caps	Unlined PP or PE Caps	PTFE or lined caps
Sample Labels	Lab approved, printed or pre-labeled	Sharpie on Bottle, Vinyl Duct Tape, Waterproof label
Pens & Paper	Ballpoint pens or graphite pencils	Permanent markers (may contain fluorochemicals), waterproof paper
Gloves	Nitrile - clean, powder-free	Latex, Vinyl, or Teflon gloves
Sample Handling Tools	Stainless steel, Teflon-free plastic dedicated to PFAS use	Shared, uncleaned tools; fluoropolymer-coated tools
Tubing	HDPE, Polyethylene, or Silicone	Teflon™, PTFE, FEP, PVC tubing
Decontamination Supplies	Lab-certified PFAS-free decon solutions or DI water only	Consumer-grade soap, wipes, or surfactant-containing products
Field Blanks	Certified PFAS-free DI water Provided by lab	Tap water or untested DI water
Coolers	Clean, plastic, dedicated for sampling use	Reused or shared coolers without cleaning, Styrofoam with unknown history
Ice Packs	Wet Ice Pack Sealed in Ziplock bags, or Dry Ice for 1633A frozen	Blue Icepacks, Loose ice directly in contact with bottles

PFAS Sampling Procedures



All PFAS

- Powder-free **nitrile** gloves, change between samples.
- **Label all bottles** with Date, Time, Site ID
- Store in a Ziploc bag, placed in a cooler with wet ice in its own separate Ziploc bag. No icepacks.
- Don't rinse the sample container
- Don't touch/contaminate the inside of the lid.



PFAS Surface Water

- Grab sample, no intermediate containers
- **Submerge** bottle neck-down, fill to shoulder
- Avoid the surface micro layer



PFAS Groundwater

- Use PFAS-Free intermediate sampling device (bailer, DO dunker, niskin bottle, pump)
- HDPE or PP Tubing (1ft silicone in pump)
- Obtain sufficient sample in the device to completely fill the sample container.
- **Start pouring sample out of the device BEFORE collecting into the container.**
- Place container under flowing stream and fill.
- Do not stop the flow before or during filling.



PFAS Soil/Biosolids

- Grab sample, no intermediate containers or composite sampling
- HDPE/PP Jars (No glass)
- Use Stainless steel equipment



PFAS DW

- Remove any aerator, hose, or Teflon tape from spigot.
- **Flush the water tap for 3–5 minutes**
- Reduce stream to pencil thin.
- **Use Pre-preserved containers, Do not overfill, rinse, or pour out any liquid** from the bottle.
- Collect a **Field Blank** with lab provided PFAS-Free DI water. [just pour from one container to the other]
- Contact Lab if Chlorine residual is above **2 mg/L**

PFAS

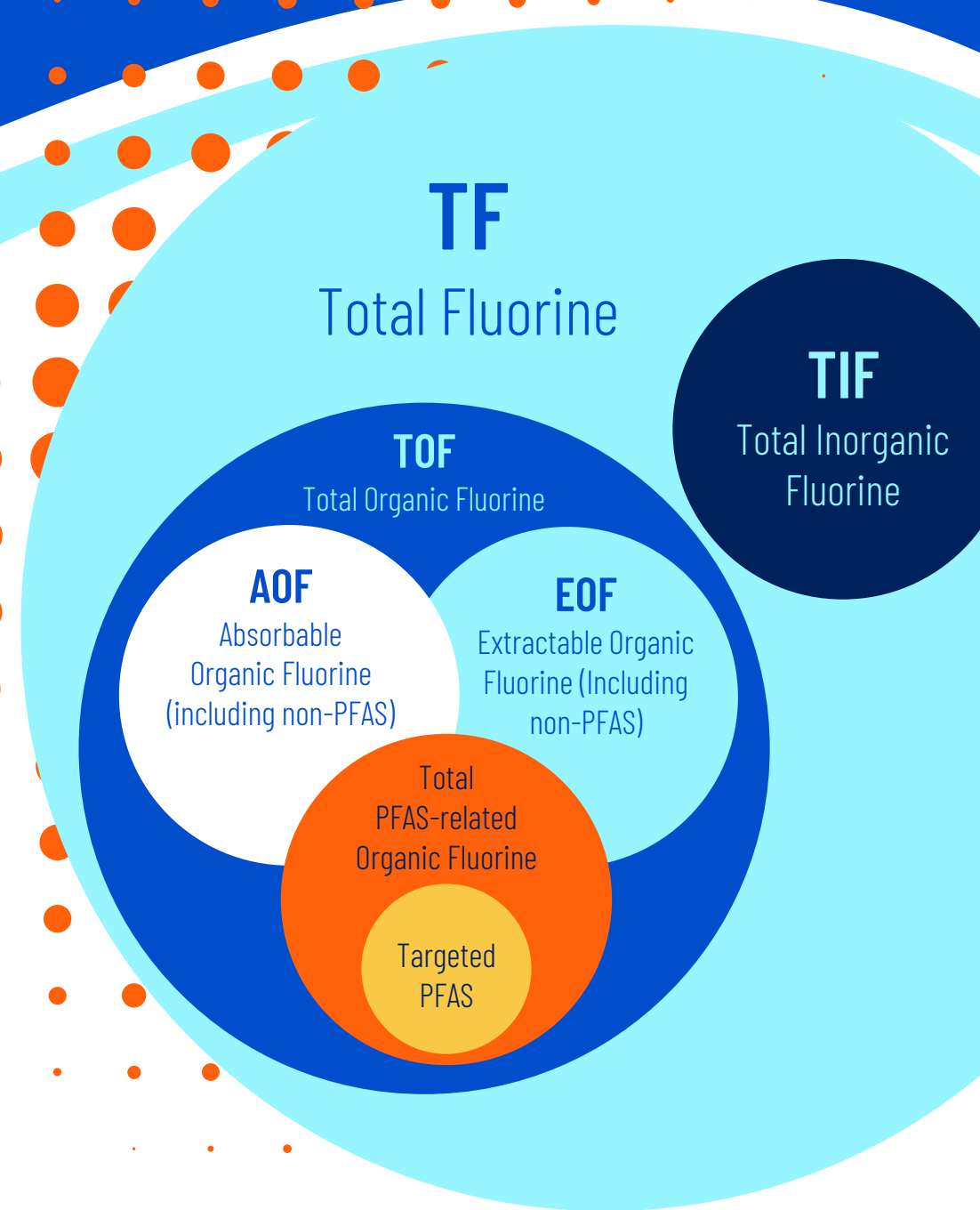
Method Selection

Type of Site(s)	Matrix	Regulatory Framework	Method	# of PFAS Analytes	MCL/CTL	Container Type	Preservative	Hold Time
- Public Water Systems (PWS) - Community Water Systems (CWS) - Non-Transient Non-Community Water systems (NTNCWS) - Drinking Water Wells - Potable Reuse	Raw and Treated Drinking Water	- NPDWR - UCMR5 - SDWA	EPA 533	25: Includes short chain compounds (C4 - C12)	PFOA = 4.0 ppt (ng/L) PFOS = 4.0 ppt (ng/L)	250 mL	1 g/L Ammonium Acetate - Cool < 6 °C (Do not Freeze)	- Extract 28 Days - Analyze 28 Days
			EPA 537.1	18: Includes some of 533 + 4 additional		HDPE or Polypropylene, Un-lined Cap	5 g/L Trizma - Cool < 6 °C (Do not Freeze)	- Extract 14 Days - Analyze 28 Days
- Landfills - Fire Training Areas - Military Bases - Airports - Carwashes - Brownfield Sites - Industrial Discharge - Municipal Sludge - Wastewater I/E	Non-Potable: - Leachate - Groundwater - Surface Water - Wastewater Solids: - Sludge - Sediment - Biosolids - Soil	- RCRA - CERCLA - DoD Compliance - VCTC - Tax Credit - State GCTL/ SCTL	EPA 1633A	42	GCTL*: - PFOA = 70 ppt - PFOS = 70 ppt or sum SCTL*: - PFOA = 1.3 res; 25 com; 0.002 leach. - PFOS = 1.3 res; 25 com; 0.007 leach. (mg/Kg) <i>*Provisional</i>	Non-Potable: 2 X 500 mL + 250 mL for TSS Solids: HDPE or PP Un-lined Cap 4 oz HDPE jars (No Glass)	- Store in Dark - Cool < 6 °C, or Freeze < -20 °C	Non-Potable: - Extract 28 Days** - If frozen: Extract 90 Days - Analyze 90 Days Solids: - Extract 90 Days** - Analyze 90 Days
- Fingerprinting - Source Delineation - Screening	Aqueous	- Remedial Investigation - Treatment Design	ASTM D8421	42	Use EPA 1633A for Compliance	15 mL Tube HDPE or PP Un-lined Cap	Cool < 6 °C Do not Freeze	Analyze 28 Days
- AFFF Spill Cleanup - Land Application - Source Delineation - Screening	Soil	- CERCLA - Remedial Investigation - RCRA - State Cleanup Programs	ASTM D8535	42	Use EPA 1633A for Compliance	4 oz HDPE jar w/ ~10 g Sample HDPE or PP Un-lined Cap (No glass)	Cool < 6 °C Do not Freeze	Analyze 28 Days

**EPA 1633A (latest revision): if not frozen, and if analytes of interest are NMeFOSE, NEtFOSE, NMeFOSAA, NEtFOSAA = 7d Hold Aq. NFDHA = 3d hold Soil.

Total vs. Targeted

- Targeted PFAS Compounds
 - Commercial labs can typically test for up to ~ 75 analytes
- Total Oxidizable Precursors (TOP)
- Total Organic Fluorine (TOF)
 - Can be surrogate for total PFAS
- Adsorbable Organic Fluorine (AOF)
- Extractable Organic Fluorine (EOF)



Sample Prep



Automated SPE

Solid Phase Extraction (SPE) method for separating target analytes from background matrix



Soil Microwave Extraction

Microwave assisted extraction for soil and biosolids matrices. Greatly enhances throughput and quality.



Sample Concentration

Nitrogen gas and a heated water bath is used to concentrate samples down to 1 mL.

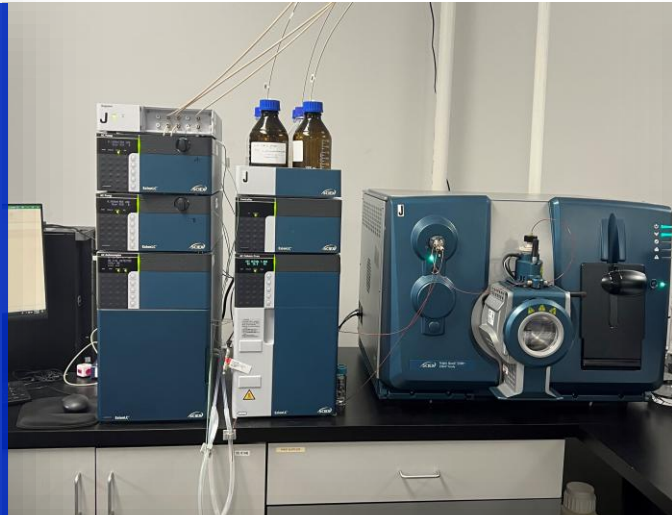


Instrumental Analysis



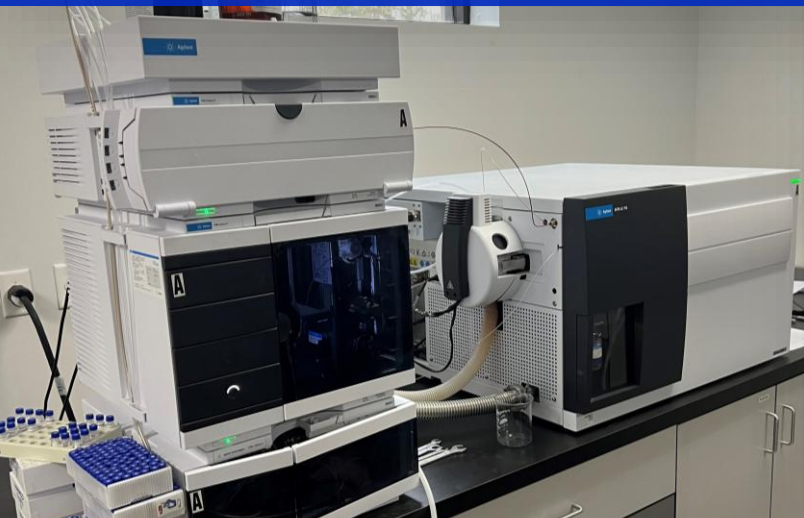
LC-MS/MS

Liquid Chromatography
tandem mass spectrometry
instrument



Quantitative Analysis

Results of target analytes are
corrected for any losses that occur
during sample extraction, extract
cleanup, and concentration.



Isotope Dilution

Isotopically labeled analogues
of known concentration added
to the sample prior to
extraction.





KEYS TO SUCCESS

- Communication and schedule
- Proper method selection
- Collect extra volume
- Field blanks as insurance policy
- Minimize particulates during sample collection
- Be mindful of potential future regulations
- Consider multiple complimentary methods
- Ask lab about results if they don't make sense to you!

Advanced Environmental Laboratories, Inc.

THANKS FOR YOUR ATTENTION!

Questions?



**PFAS Method Selection
& Field Guide**



**PFAS WW Biosolids
Guide**



**PFAS DW NPDWR
Rules**



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