
Automating Solvent Extraction for EPA 1633A: A Closer Look at Increasing Efficiency in the Lab



We Simplify Science

Alicia Stell, PhD

NEMC 2025

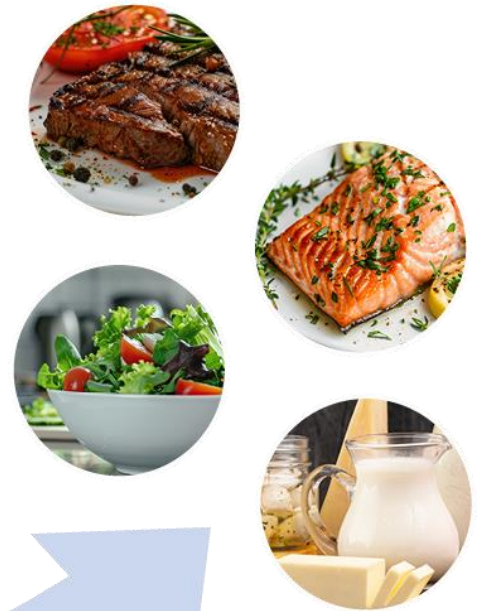
PFAS are Everywhere



PFAS enter soil and groundwater through runoff, irrigation, soil additives, and chemical input.



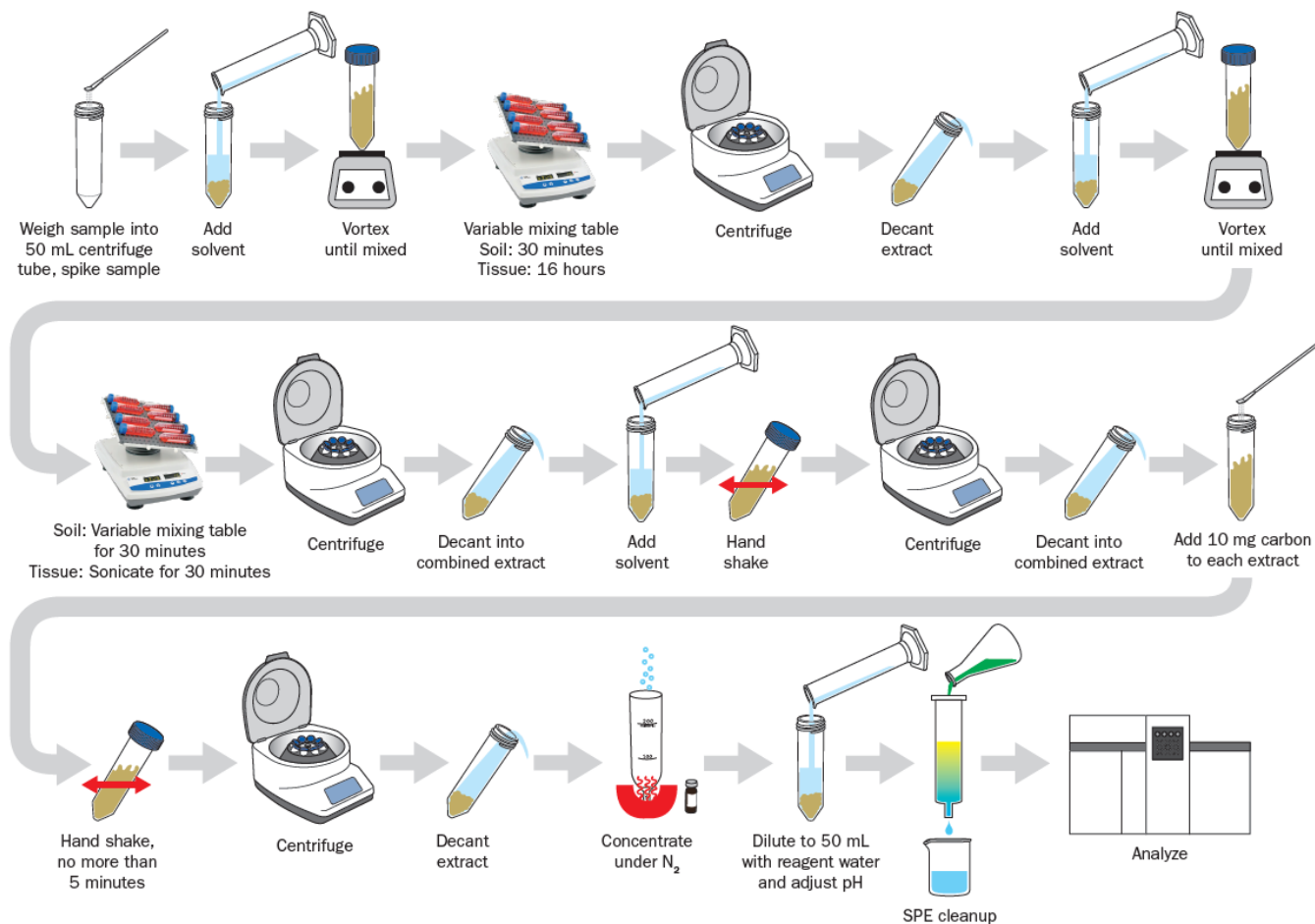
PFAS move through the food chain into the products we use.



EPA Method for PFAS in Solid Samples

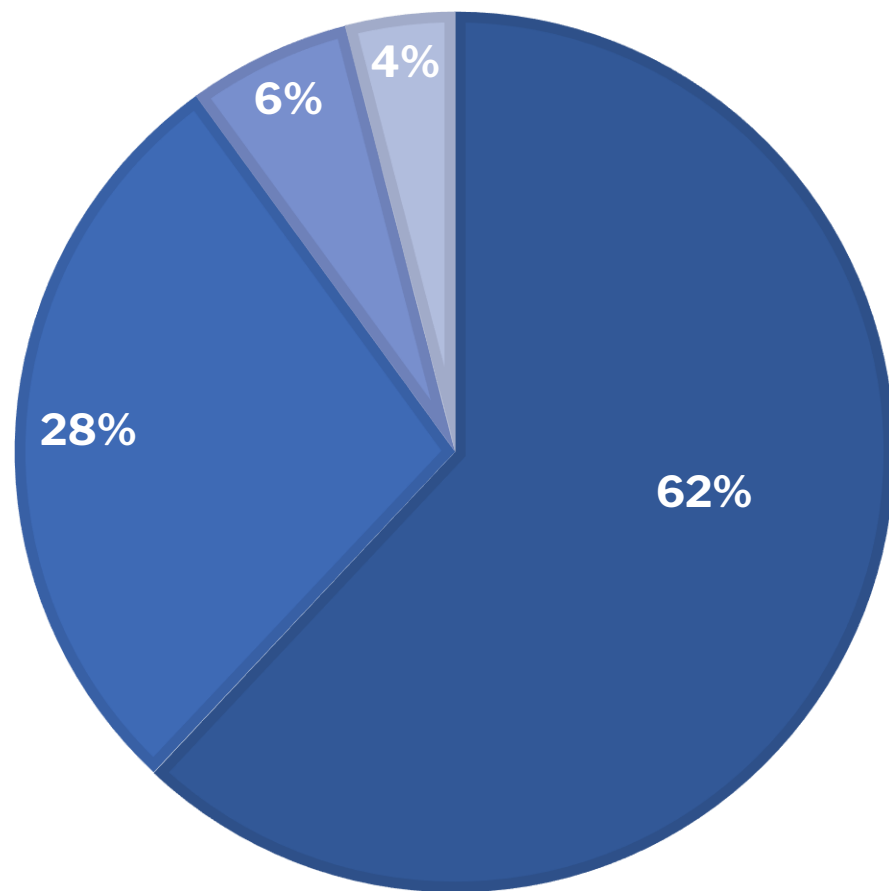
EPA 1633A

Soils, Biosolids, Tissue



Sample Preparation is the Bottleneck

■ Sample Prep ■ Data Management ■ Collection ■ Analysis



This needs to change.

Rapid, simple, and efficient sample preparation.

R.E. Majors, LC/GC Magazine

EDGE PFAS: Automated Extraction



- Pressurized Fluid Extraction
- Sequential – automates 12 sample per rack
- Filtration step included
- Reusable Q-Cup (sample cell)
- Tested for no PFAS contamination

EDGE PFAS: Advantages



- Automation
- Improved repeatability
- Simple
- Applicable to many matrix types
- Safe

EDGE PFAS: Advantages



Rapid, simple, and efficient sample preparation.

EDGE PFAS: Sample Preparation



Layered in Q-Cup
Spike: Natives and EIS per EPA 1633A
Sample: 5 g Soil, 2 g Tissue
1 g eCleanUP™ (Soil Only)
Q-Disc® PFAS (filter)

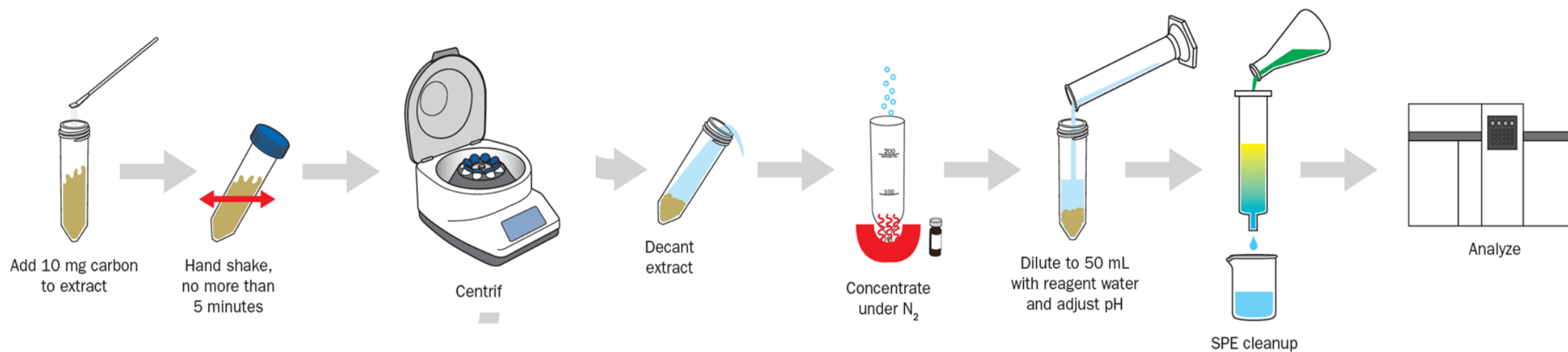
EDGE PFAS: Soil Method

Cycle	Solvent	Top Add (mL)	Temp (°C)	Hold Time
1	0.3% Methanolic Ammonium Hydroxide	10	65	3:00
2	0.3% Methanolic Ammonium Hydroxide	15	65	3:00
3	0.3% Methanolic Ammonium Hydroxide	5	--	--÷--
Wash 1	Isopropanol	10	--	--÷--
Wash 2	Methanol	10	65	0:30
Wash 3	0.3% Methanolic Ammonium Hydroxide	10	--	--÷--

EDGE PFAS: Tissue Method

Cycle	Solvent	Top Add (mL)	Temp (°C)	Hold Time
1	0.05 M KOH in Methanol	10	65	3:00
2	Acetonitrile	10	65	3:00
3	0.05 M KOH in Methanol	5	--	--:--
Wash 1	Isopropanol	10	--	--:--
Wash 2	Methanol	10	65	0:30
Wash 3	0.05 M KOH in Methanol	10	--	--:--

Cleanup and Analysis

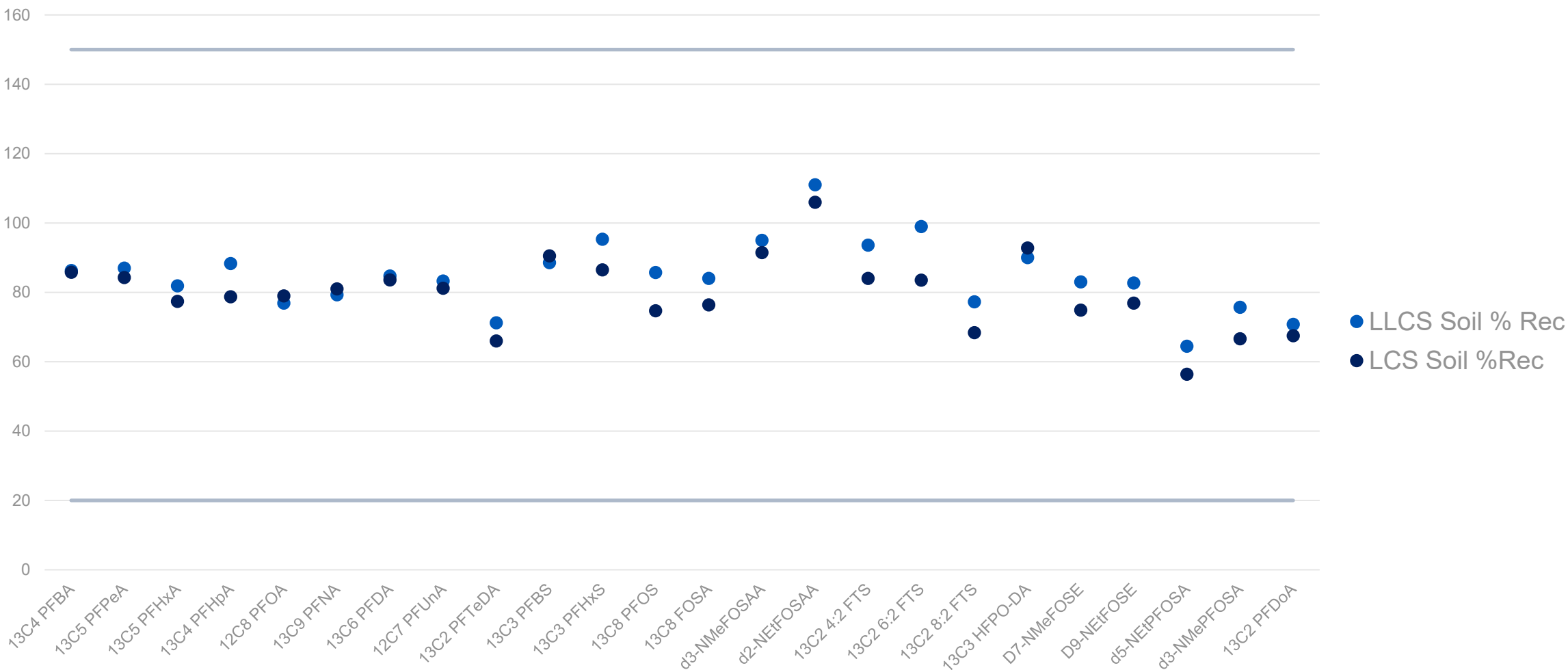


System Blank

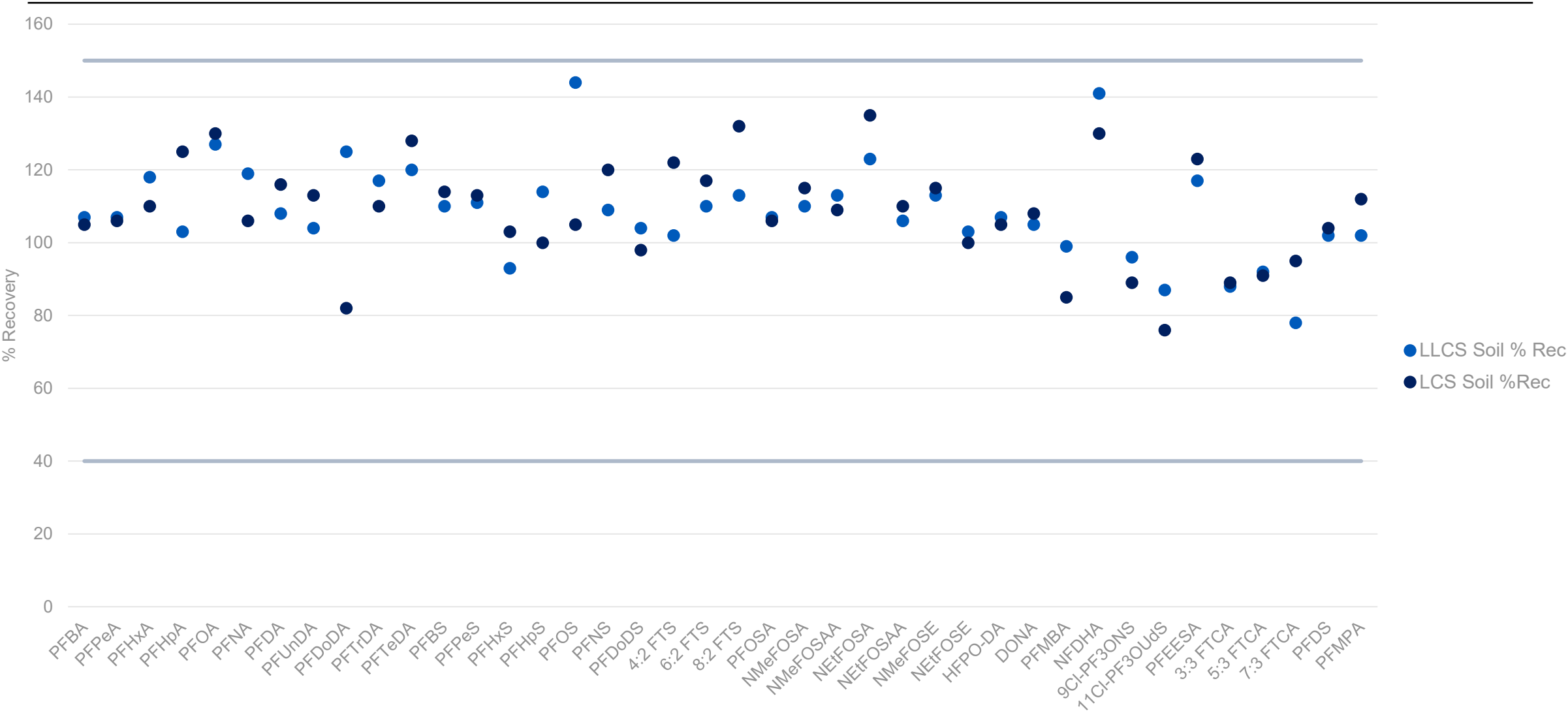
- All PFAS not detected at the reporting limit
- Ran after mid-spike sample
- Analyzed 01/27/25

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	I
Perfluorooctanoic acid (PFOA)	ND		0.500	ng/g		01/22/25 11:16	01/27/25 21:59	
Perfluorononanoic acid (PFNA)	ND		0.500	ng/g		01/22/25 11:16	01/27/25 21:59	
Perfluorodecanoic acid (PFDA)	ND		0.500	ng/g		01/22/25 11:16	01/27/25 21:59	
Perfluoroundecanoic acid (PFUnA)	ND		0.500	ng/g		01/22/25 11:16	01/27/25 21:59	
Perfluorododecanoic acid (PFDoA)	ND		0.500	ng/g		01/22/25 11:16	01/27/25 21:59	
Perfluorotridecanoic acid (PFTrDA)	ND		0.500	ng/g		01/22/25 11:16	01/27/25 21:59	
Perfluorotetradecanoic acid (PFTeDA)	ND		0.500	ng/g		01/22/25 11:16	01/27/25 21:59	
Perfluorobutanesulfonic acid (PFBS)	ND		0.500	ng/g		01/22/25 11:16	01/27/25 21:59	
Perfluoropentanesulfonic acid (PFPeS)	ND		0.500	ng/g		01/22/25 11:16	01/27/25 21:59	
Perfluorohexanesulfonic acid (PFHxS)	ND		0.500	ng/g		01/22/25 11:16	01/27/25 21:59	
Perfluoroheptanesulfonic acid (PFHpS)	ND		0.500	ng/g		01/22/25 11:16	01/27/25 21:59	
Perfluorooctanesulfonic acid (PFOS)	ND		0.500	ng/g		01/22/25 11:16	01/27/25 21:59	
Perfluorononanesulfonic acid (PFNS)	ND		0.500	ng/g		01/22/25 11:16	01/27/25 21:59	
Perfluorodecanesulfonic acid (PFDoS)	ND		0.500	ng/g		01/22/25 11:16	01/27/25 21:59	
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	ND		2.00	ng/g		01/22/25 11:16	01/27/25 21:59	
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	ND		3.00	ng/g		01/22/25 11:16	01/27/25 21:59	
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	ND		2.00	ng/g		01/22/25 11:16	01/27/25 21:59	
Perfluorooctanesulfonamide (PFOSA)	ND		0.500	ng/g		01/22/25 11:16	01/27/25 21:59	
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		0.500	ng/g		01/22/25 11:16	01/27/25 21:59	
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.500	ng/g		01/22/25 11:16	01/27/25 21:59	
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		0.500	ng/g		01/22/25 11:16	01/27/25 21:59	
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.500	ng/g		01/22/25 11:16	01/27/25 21:59	
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		5.00	ng/g		01/22/25 11:16	01/27/25 21:59	
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		5.00	ng/g		01/22/25 11:16	01/27/25 21:59	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		2.00	ng/g		01/22/25 11:16	01/27/25 21:59	
4,8-Dioxo-3H-perfluorononanoic acid (DONA)	ND		2.00	ng/g		01/22/25 11:16	01/27/25 21:59	
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		1.00	ng/g		01/22/25 11:16	01/27/25 21:59	
Nonfluoro-3,6-dioxahexanoic acid (NFDHA)	ND		1.00	ng/g		01/22/25 11:16	01/27/25 21:59	
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	ND		2.00	ng/g		01/22/25 11:16	01/27/25 21:59	
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUDS)	ND		2.00	ng/g		01/22/25 11:16	01/27/25 21:59	
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		1.00	ng/g		01/22/25 11:16	01/27/25 21:59	
3-Perfluoropropylpropanoic acid (3:3 FTCA)	ND		2.50	ng/g		01/22/25 11:16	01/27/25 21:59	
3-Perfluoropentylpropanoic acid (5:3 FTCA)	ND		12.5	ng/g		01/22/25 11:16	01/27/25 21:59	
3-Perfluoroheptylpropanoic acid (7:3 FTCA)	ND		12.5	ng/g		01/22/25 11:16	01/27/25 21:59	
Perfluorodecanesulfonic acid (PFDS)	ND		0.500	ng/g		01/22/25 11:16	01/27/25 21:59	
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		1.00	ng/g		01/22/25 11:16	01/27/25 21:59	

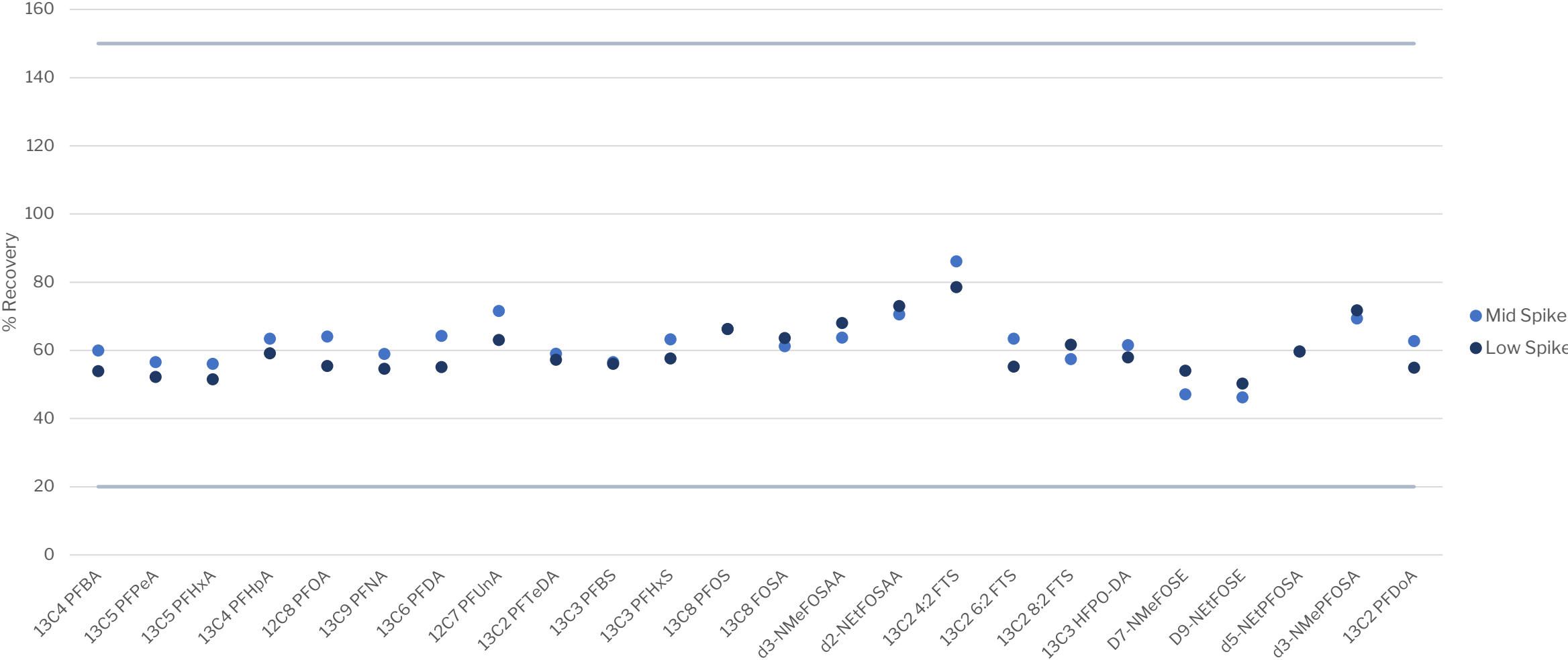
QC Data: Soil EIS



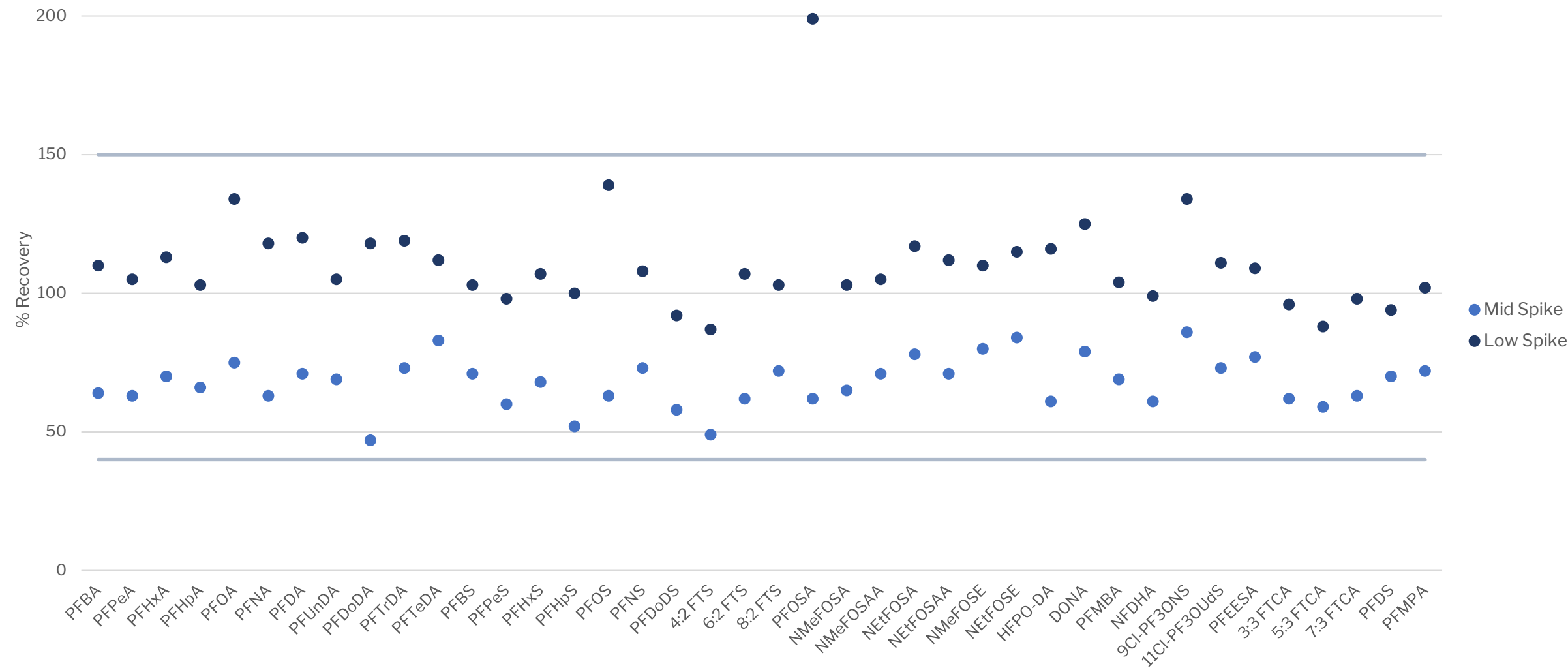
QC Data: Soil Native Compounds



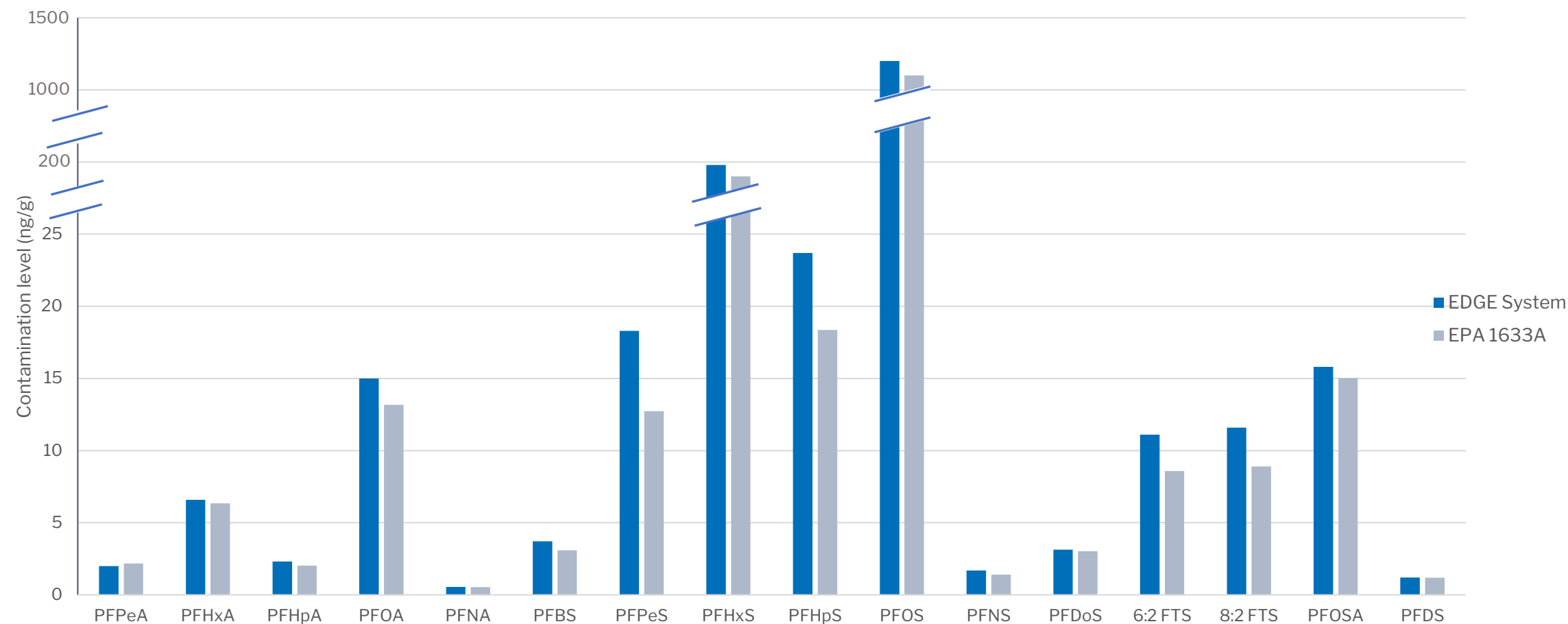
QC Data: Tissue EIS



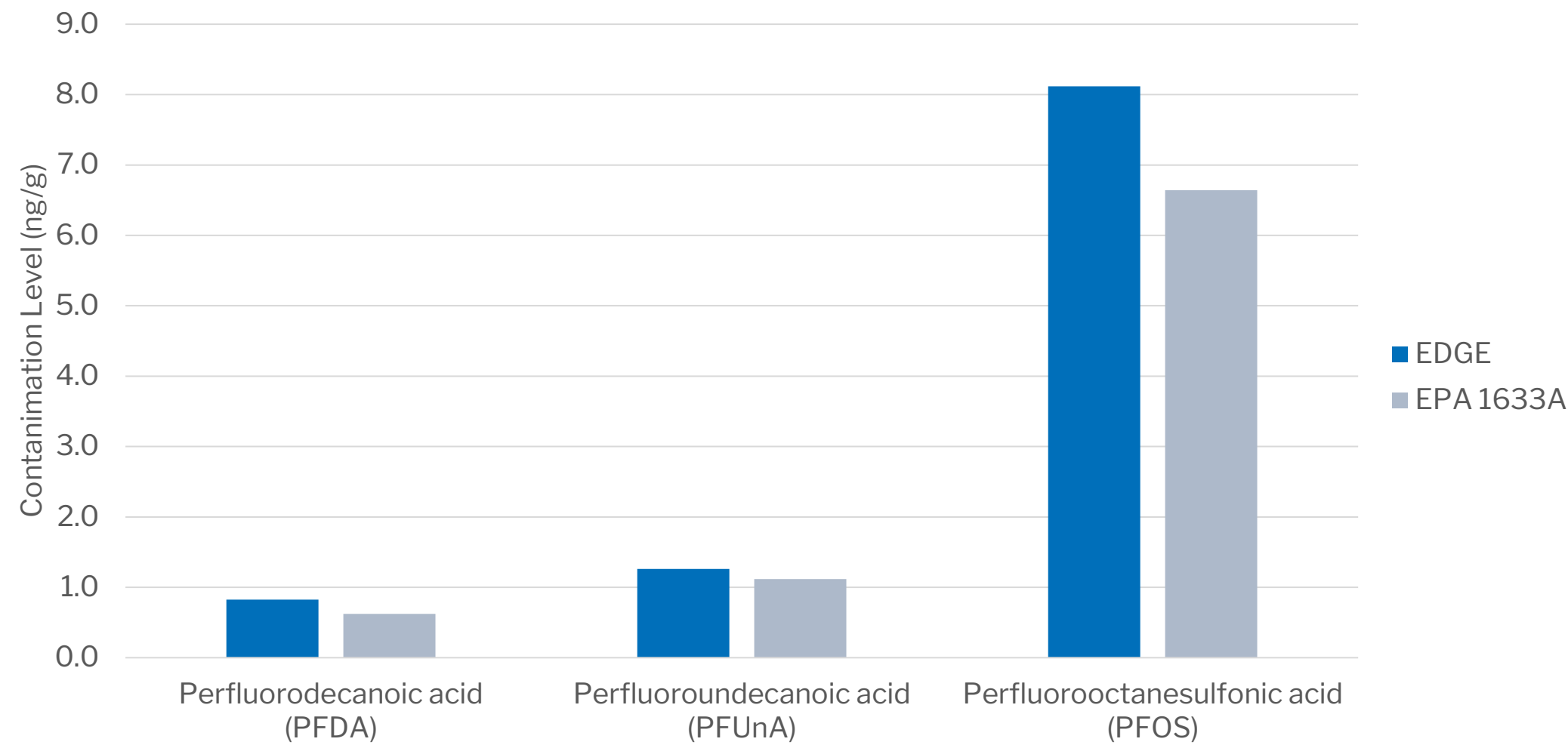
QC Data: Tissue Native Compounds



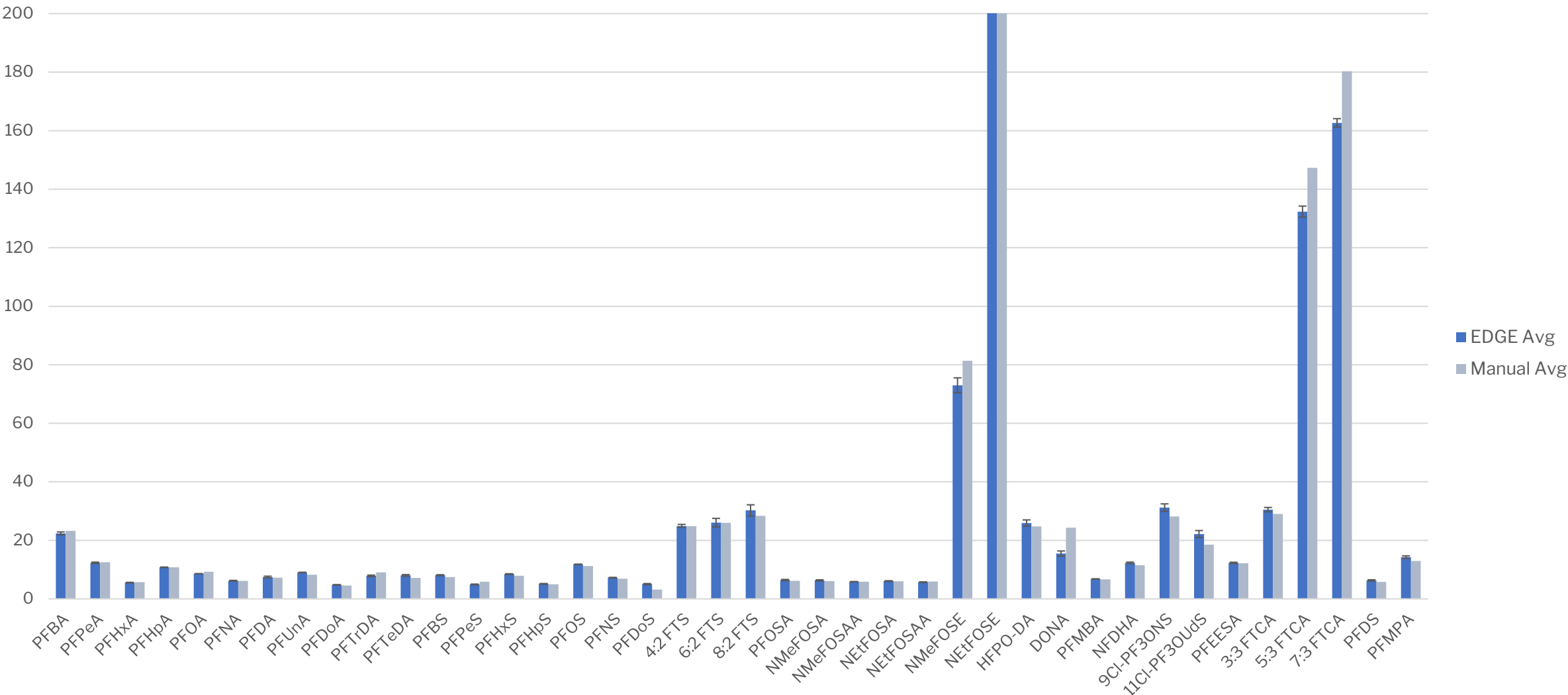
Data: Contaminated Soil



Data: Contaminated Tissue



Data: Contaminated Spiked Tissue

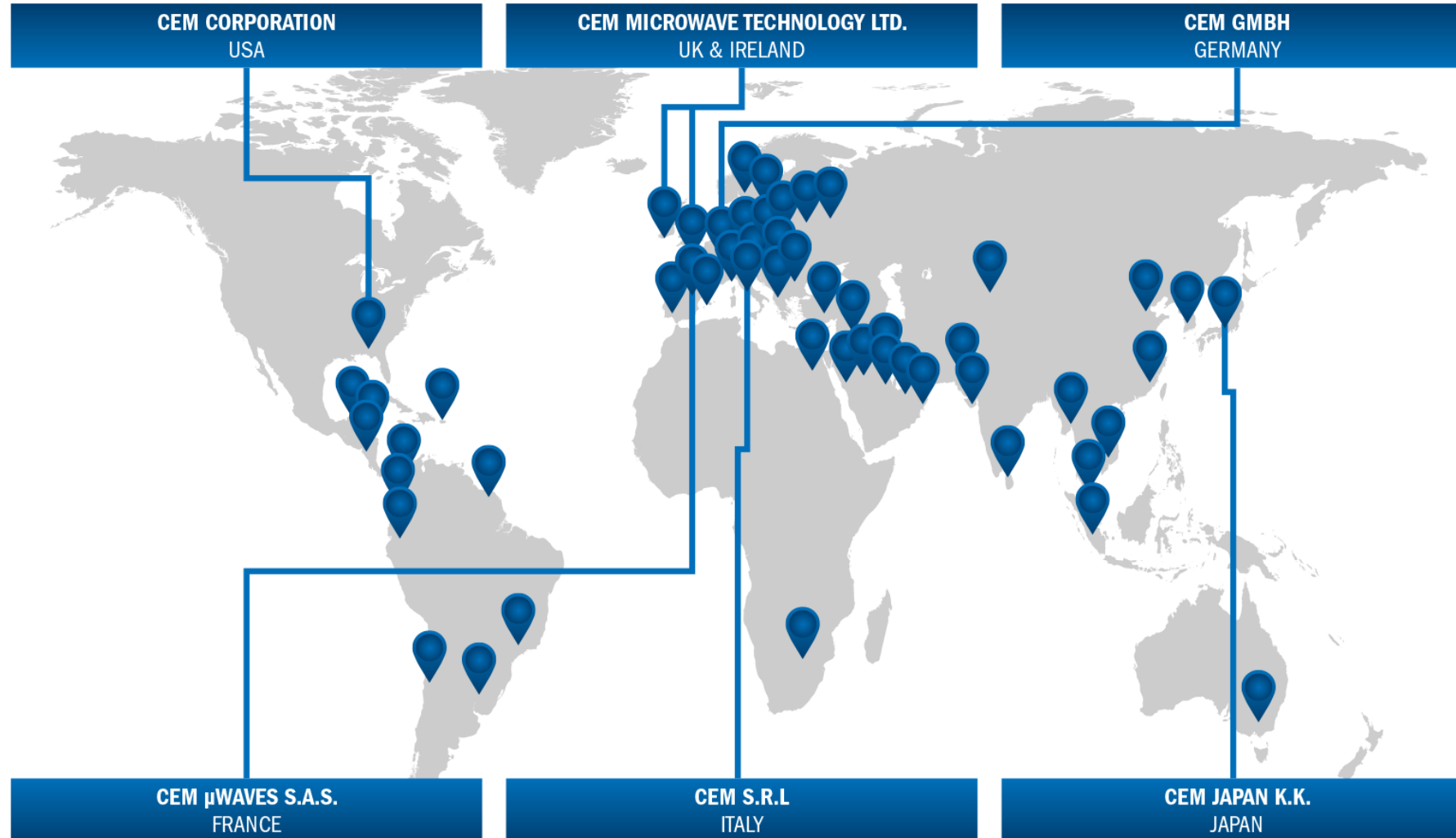


Summary

- No contamination from system or consumables
- QC meets performance criteria of EPA 1633A
- EDGE PFAS data comparable to manual method for contaminated samples
- Rapid, simple, and efficient solvent extraction of PFAS from solid samples



We Are Where You Are



- Direct employees scattered throughout the United States and Canada
- Worldwide network of dealers and subsidiaries

Acknowledgements



Layla Abu-Al-Halaweh
Applications Scientist



Benedict Liu
Applications Specialist



Brittany Fessler
Product Specialist

Thank you to Eurofins Lancaster Laboratories – where all data was collected



cem.com

Questions

Alicia.Stell@cem.com

Organic.Support@cem.com