



Solid Waste Landfill PFAS Update  
DEQ Science Advisory Board  
April 1, 2026



# *Review/Overview –PFAS Approach & Strategy for SW Landfills*

Address PFAS from a Regulatory Framework for Protection of Public Health & Environment

- 02L Groundwater Standards
- EPA MCLs (for drinking water)

Division of Waste Management (DWM) has joint authority with Water Resources to enforce 2L Rules for exceedances of groundwater standards

March 2023 – Required all LFs to collect & analysis groundwater, surface water, leachate for presence of PFAS.

PFAS data reported to DWM lays the groundwork for better understanding the state of PFAS contamination from landfills and developing strategies for action.

Sets the basis for further regulatory action at individual landfills based on reported groundwater PFAS levels and assessment of the potential for offsite migration and risks to surrounding drinking water supply wells.

# Overview – PFAS Groundwater Monitoring Data

## Data Management:

Groundwater Data uploaded by staff to DEQ's EQUS Data Processor (EDP) v7.23.1

## 202 Landfills Reporting

- 137 MSWs (39 active lined and 98 closed unlined)
- 38 C&Ds (unlined)
- 14 Industrial (mostly unlined)
- 13 Coal Combustion Residual landfills (CCRs)

## 3477 Groundwater Samples in Total

## PFAS Analysis:

- EPA Method 1633 (Draft), EPA Method 1633 (Final)
- EPA Method 537.1 Modified (for subset of samples)

Data Collection/Reporting Period: December 2023 to June 2025

PFAS by LC/MS/MS									
Client: Pace Analytical Services, Inc.								Laboratory ID: Y122007-001	
Description: #801.MNH1								Matrix: Aqueous	
Date Sampled: 09/19/2023 1329				Project Name: Catawba Co - Newton LF					
Date Received: 09/22/2023				Project Number: 92689326					
Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch		
1	1633	1633	1	10/22/2023 2041	ARC2	10/19/2023 1549	87910		
2	1633	1633	5	10/24/2023 0203	ARC2	10/19/2023 1549	87910		
Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run	
11-Chlorooctadecafluoro-3-oxadecane-1-sulfonic acid (11C1-PFS)	763051-92-9	1633	ND		3.7	0.82	ng/L	1	
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9C1-PFS)	926426-58-1	1633	ND		3.7	0.83	ng/L	1	
4,8-Dioxa-2H-perfluorononanoic acid (ADONA)	919050-14-4	1633	ND		3.7	0.82	ng/L	1	
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8-2FTS)	39109-34-4	1633	ND		3.7	0.57	ng/L	1	
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4-2FTS)	757124-72-4	1633	ND	Q	3.7	0.37	ng/L	1	
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6-2FTS)	27619-97-2	1633	4.8	Q	4.7	1.9	ng/L	1	
2H,2H,3H,3H-Perfluorooctanoic acid (5-3FTCA)	914837-49-3	1633	4.1	J	2.3	4.0	ng/L	1	
Hexafluoropropylene oxide dimer acid (HFPO-DA)	13252-13-6	1633	ND		3.7	0.93	ng/L	1	
N-ethyl perfluorooctanesulfonamide (NEFOSA)	4191-55-2	1633	ND		0.83	0.12	ng/L	1	
N-ethyl perfluorooctanesulfonamideacetic acid (NEFOSAA)	2991-00-6	1633	ND		0.83	0.27	ng/L	1	
N-ethyl perfluorooctanesulfonamideethanol (NEFOSE)	1691-00-2	1633	ND		0.3	0.57	ng/L	1	
N-methyl perfluorooctanesulfonamide (NMeFOSA)	31505-32-8	1633	ND		0.83	0.20	ng/L	1	
N-methyl perfluorooctanesulfonamideacetic acid (NMeFOCAA)	2355-31-9	1633	ND		0.83	0.28	ng/L	1	
N-methyl perfluorooctanesulfonamideethanol (NMeFOSEA)	2444-06-7	1633	ND		0.3	0.59	ng/L	1	
Nonafluoro-3-dioxapentanoic acid (NFDA)	151772-05-8	1633	ND		1.9	0.54	ng/L	1	
Perfluoro(2-ethoxyethane)sulfonic acid (PFESA)	113507-82-7	1633	ND		1.9	0.34	ng/L	1	
Perfluoro-3-methoxypropanoic acid (PFMPA)	377-73-1	1633	0.69	J	1.9	0.17	ng/L	1	
Perfluoro-4-methoxybutanoic acid (PFMBA)	863090-89-5	1633	1.8	J	1.9	0.36	ng/L	1	
Perfluorobutanesulfonic acid (PFBS)	375-73-5	1633	12		0.93	0.988	ng/L	1	
Perfluorobutanoic acid (PFBA)	375-22-4	1633	440	Q	3.7	0.48	ng/L	1	
Perfluorodecane sulfonic acid (PFDS)	332-77-3	1633	ND		0.83	0.15	ng/L	1	
Perfluorodecanoic acid (PFDA)	335-75-2	1633	ND		0.93	0.13	ng/L	1	
Perfluorododecane sulfonic acid (PFDS)	70780-38-5	1633	ND		0.83	0.14	ng/L	1	
Perfluorododecanoic acid (PFDDA)	307-55-1	1633	ND		0.83	0.10	ng/L	1	
Perfluoroheptane sulfonic acid (PFHS)	375-62-8	1633	ND		0.83	0.18	ng/L	1	
Perfluoroheptanoic acid (PFHPA)	375-85-9	1633	0.93		0.93	0.20	ng/L	1	
3-Perfluorobutyl propanoic acid (3-3FTCA)	812-70-4	1633	ND		2.3	3.9	ng/L	1	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	1633	13		0.93	0.17	ng/L	1	
Perfluorohexanoic acid (PFHxA)	307-24-4	1633	1300		4.7	0.66	ng/L	2	
Perfluorononanesulfonic acid (PFNS)	68250-12-1	1633	ND		0.83	0.14	ng/L	1	
Perfluorononanoic acid (PFNA)	375-95-1	1633	0.31	J	0.93	0.096	ng/L	1	
Perfluorooctanesulfonic acid (PFOSA)	754-01-8	1633	ND		0.83	0.19	ng/L	1	
Perfluorooctanoic acid (PFOA)	1763-23-1	1633	0.74	J	0.93	0.23	ng/L	1	
Perfluorooctanoic acid (PFOA)	335-67-1	1633	280		0.93	0.20	ng/L	1	
Perfluoropentanesulfonic acid (PFPeS)	2786-91-4	1633	8.6		0.93	0.24	ng/L	1	
Perfluoropentanoic acid (PFPeA)	2786-90-3	1633	330		1.9	0.17	ng/L	1	
3-Perfluoropropyl propanoic acid (3-3FTCA)	356-02-5	1633	31		4.7	0.56	ng/L	1	
Perfluoroundecanoic acid (PFUDA)	375-06-7	1633	ND		0.83	0.25	ng/L	1	
Perfluoroundecanoic acid (PFTDA)	72829-04-8	1633	ND		0.93	0.18	ng/L	1	
Perfluoroundecanoic acid (PFLnA)	2058-04-8	1633	ND		0.93	0.23	ng/L	1	

LOQ = Limit of Quantitation    D = Deleted in the method blank    E = Quantitation of compound exceeded the calibration range    DL = Detection Limit    Q = Duplicate failure  
 ND = Not detected at or above the DL    N = Recovery is out of criteria    P = The MPD between two GC columns exceeds 40%    J = Estimated result - LOQ and  $\pm$  LOQ    L = LCL/LOQ failure  
 H = Out of holding time    W = Reported on wet weight basis    S = Estimated result - LOQ and  $\pm$  LOQ    M = M/GM/SD failure

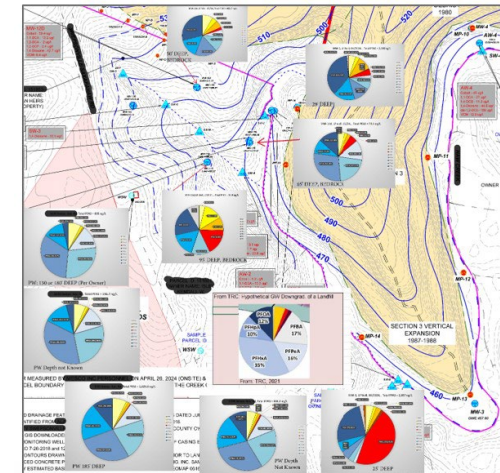
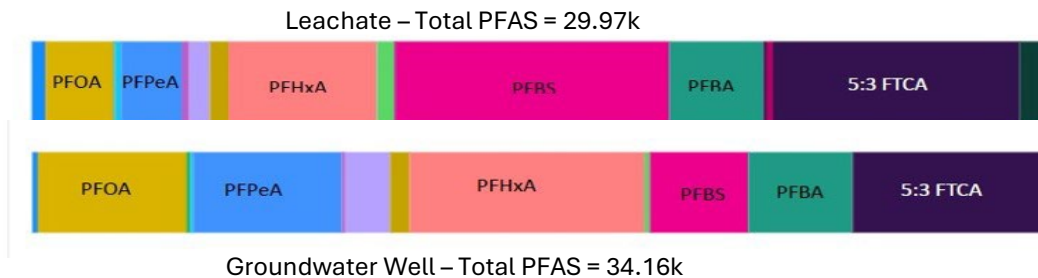
Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)  
 100 Vantage Point Drive, West Columbia, SC 29172 (803) 791-6700 Fax (803) 791-6111 www.pacelabs.com



# Data Evaluation

## DWM PFAS Signature Tool

- Excel-based tool used to analyze PFAS data and create visual graphs showing relative distribution of PFAS sample set by type or analyte for general characterization & source identification.
- Individual signatures for groundwater wells, landfill leachate, drinking water wells, etc
- Compare signatures for possible source determination evaluations



## Landfill PFAS Trends/Characterization

Preliminary analysis on data to identify any general landfill-PFAS characterization and trends by landfill type, lined/unlined, age, location, etc

# Subtitle D (Lined) Municipal Solid Waste Landfills (MSWls)

39 Landfills

953 Groundwater Samples

MSWLF Lined Comparison of PFAS Compounds

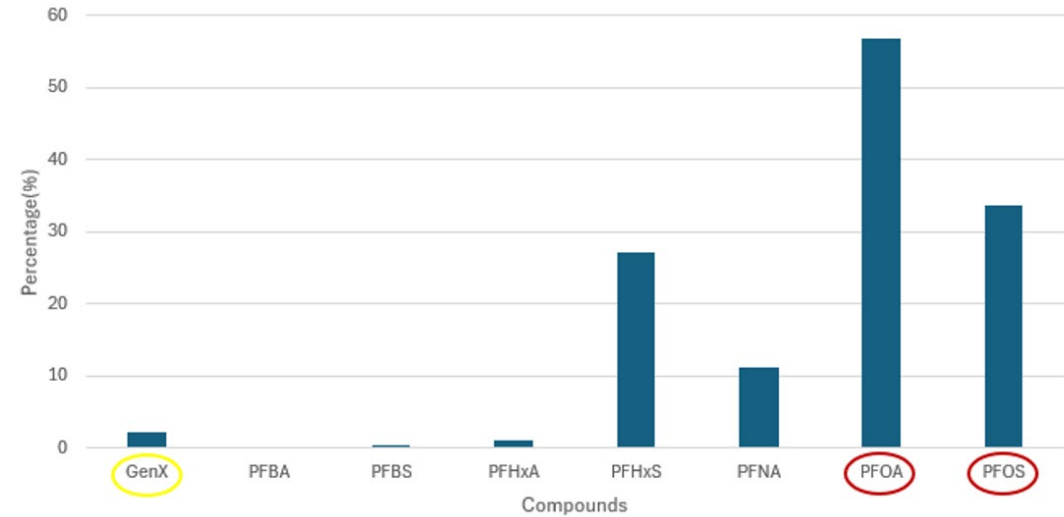


### Prevalence of PFAS Detections

>50% Detects: PFBA, PFBS, PFHxA, PFHxS, PFNA, PFOA, PFOS

16% Detects: GenX

MSWLF Lined  
PFAS Detections > Regulatory Level  
(Total Samples Collected)



### Prevalence of PFAS Exceeding Regulatory Standards

**PFOA:** 58%; ND to 2600 ppt, Median 2ppt

**PFOS:** 32%; ND to 5000 ppt, Median 11 ppt

**GenX:** 2%; ND to 2060 ppt, Median 2 ppt



\* EQUIS data as of September 2025

# Municipal Solid Waste Landfills (Closed, Unlined)

98 Landfills

1668 Groundwater Samples

MSWLF Unlined Comparison of PFAS Compounds

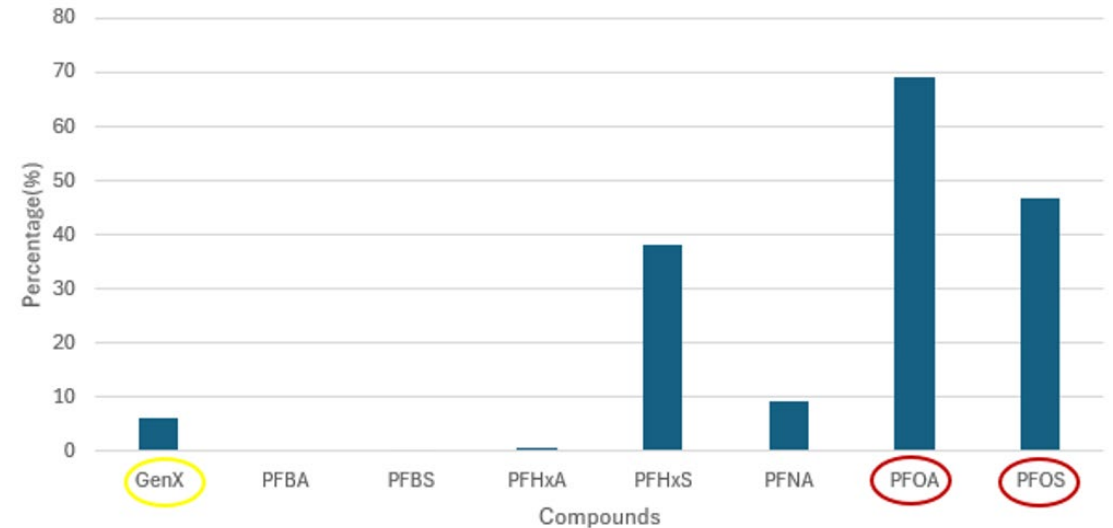


## Prevalence of PFAS Detections

>50% Detects: PFBA, PFBS, PFHxA, PFHxS, PFNA, PFOA, PFOS

15% Detects: GenX

MSWLF Unlined  
PFAS Detections > Regulatory Level  
(Total Samples Collected)



## Prevalence of PFAS Exceeding Regulatory Standards

**PFOA:** 70%; ND to 70,000 ppt, Median 24 ppt

**PFOS:** 48%; ND to 59,000 ppt, Median 7 ppt

**GenX:** 6%; ND to 7800 ppt, Median 3 ppt



\* EQUIS data as of September 2025

# Construction & Demolition Landfills

38 Landfills

542 Groundwater Samples

CDLF Comparison of PFAS Compounds

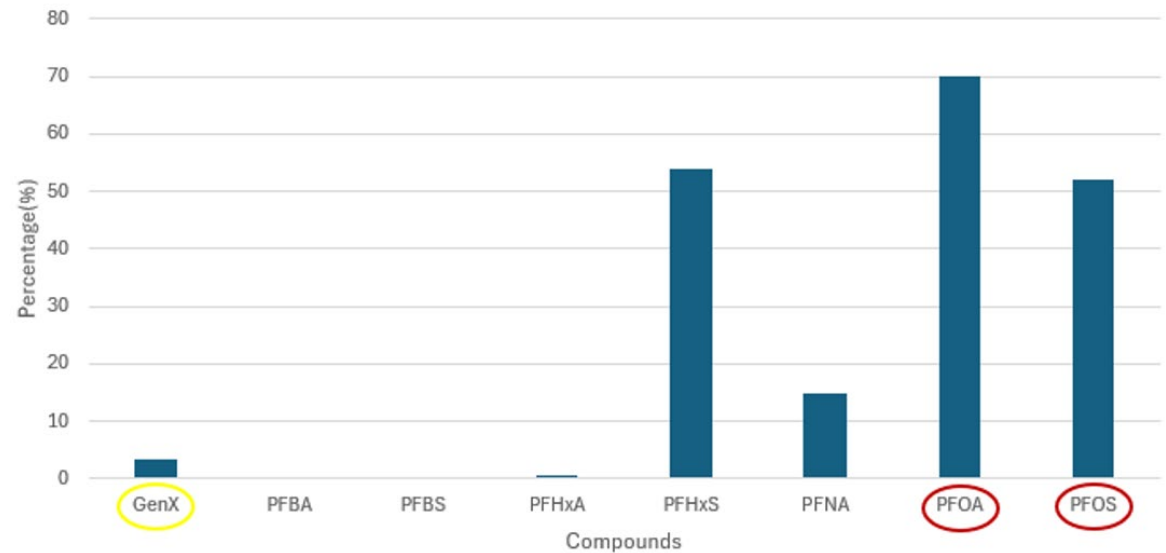


## Prevalence of PFAS Detections

>60% Detects: PFBA, PFBS, PFHxA, PFHxS, PFNA, PFOA, PFOS

17% Detects: GenX

CDLF Unlined  
PFAS Detections > Regulatory Level  
(Total Samples Collected)



## Prevalence of PFAS Exceeding Regulatory Standards

**PFOA:** 70%; ND to 5000 ppt, Median 34 ppt

**PFOS:** 52%; ND to 1100 ppt, Median 9 ppt

**GenX:** 3%; ND to 3130 ppt, Median 3 ppt

\* EQUIS data as of September 2025



# Current Assessment Examples

Assessment activities in progress for 83 landfill units located at 64 separate landfill facilities

Focus on plume delineation, source evaluations, and offsite drinking water wells

## CMS MSW Landfill – Cabarrus Co (active, lined Subtitle D landfill)

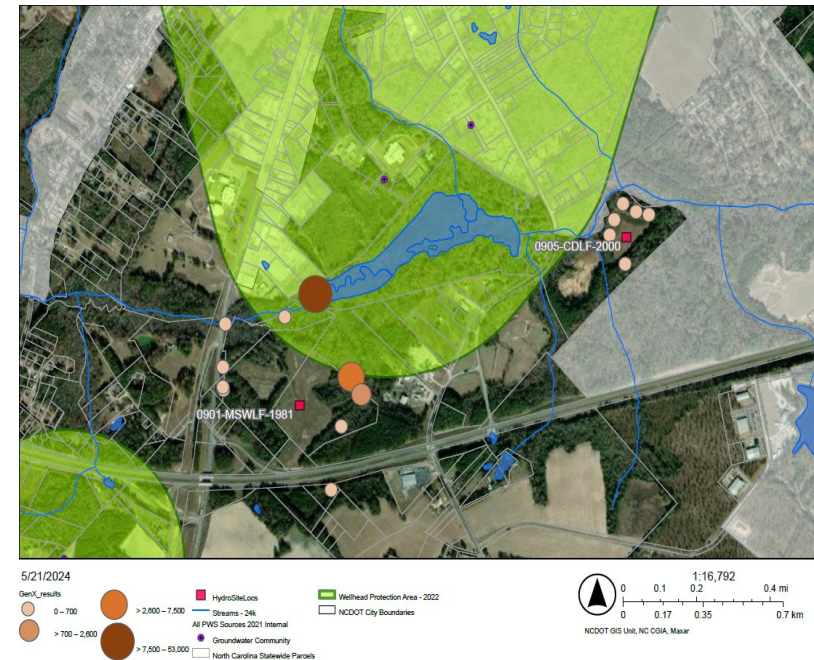
- Assessment activities include onsite well installations, expanded PFAS groundwater data collection, pore water/seep sampling along streams
- Updated receptor survey to identify potential offsite drinking water well users
- Sampling offsite private well & providing bottled water for detected MCL exceedance. Evaluating potential source connection to landfill.

## Kimberly Clark Industrial Landfill – Henderson NC (closed, unlined landfill)

- Onsite well sampling, surface water sampling, and updated receptor survey.
- Offsite private drinking water well sampling & providing alternative bottled water
- Source evaluation for drinking water well detections (ie, septic tanks as source)

## Columbus County MSW Landfill (closed, unlined landfill)

- Confirmation well sampling, well installation/sampling, surface water sampling
- Updated receptor survey and sampling offsite drinking water wells adjacent to landfill



# Next Steps

- ❑ Implementation of PFAS assessment workplans
  - Focus on contaminant delineation and, where warranted, offsite private well sampling
  - Alternative water supply if warranted provided by the facility or DWM Bernard Allen
- ❑ Anticipation in on-going landfill monitoring will continue throughout operations and post closure period at most facilities
- ❑ Evaluating PFAS detections for potential impacts to risk-based closures (emphasis on closed unlined 1983-93 landfills)
- ❑ On-going interagency coordination on
  - WWTP influent sampling and biosolids
  - Landfill Gas systems
  - Onsite leachate and groundwater treatment options (Pre-treatment costs are beyond scope of most local government budgets)
- ❑ Engaging industry to investigate why PFAS is present at certain facilities, and how that impacts the design, construction, operations and maintenance of landfills in the future. It could also require amending the rules accordingly
- ❑ Working with facilities, local government leadership, and special interest groups on landfill permitting concerns and challenges.

*Questions?*

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