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5 March 2020

Mr. Steve C. Davis
Senior Electrical Project Engineer
Leo A Daly
10 Tenth Street N.E., Suite 200
Atlanta, Georgia 30309

RE: West End Electrical Project PFAS Sampling Summary Report
Niagara Falls Air Force Reserve Station
Parent Contract: RVKQ 19-0734

Dear Mr. Davis:

EA Engineering, P.C. and its affiliate EA Science and Technology (EA), as a subcontractor to Leo A Daly and their parent contract RVKQ 19-0734, is pleased to provide this letter report as a summary of soil sampling activities completed at Niagara Falls Air Reserve Station (NFARS) Niagara Falls, New York (**Figure 1**). Field activities were completed in October and November 2019 in accordance with the Work Plan (EA 2019).[1] The field sampling was completed in support of the proposed West End Tactical air navigation system (TACAN) electrical feed repairs, which include excavation of soil to install new conduit through, and adjacent to, current and former fire training areas (FTAs). In 2018, a site inspection was completed at the former FTA (Site 9/FT007) and environmental media were evaluated for per- and polyfluoroalkyl substances (PFAS). Analytical results indicated that perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) were present in soil, groundwater, and sediment at concentrations greater than screening levels (Aerostar SES LLC 2018).[2] EA was tasked to complete field sampling to evaluate the presence or absence of PFAS in soil and/or groundwater within potential limits of excavations completed as part of the TACAN electrical feed repairs. The purpose of this letter report is to summarize the soil sample collection field activities and analytical results associated with the soil sampling event.

FIELD EVENT PREPARATION

Base Civil Engineering Work Clearance Request

A base civil engineering work clearance request was submitted on 23 August 2019 and approved on 15 October 2019.

[1] EA. 2019. *West End Electrical Project PFAS Sampling Work Plan, Niagara Falls Air Reserve Station. Niagara Falls, New York*. August.
[2] Aerostar SES, LLC. 2018. *Final Site Inspections Report of Fire Fighting Foam Usage at Niagara Falls Air Reserve Station*. December.

Underground Utility Survey

An underground utility location survey was completed by EA's subcontractor, NY Leak Detection (NYLD) on 9 and 10 October 2019 under supervision by an EA Field Geologist. The geophysical survey verified that the proposed boring locations did not conflict with subsurface utilities. Utilities were marked in an appropriate color and boring locations were marked with pink flags. The Utility Survey Report is included as **Attachment A**. Some soil boring locations were slightly adjusted, approximately 1 meter, due to adjacent utilities and/or anomalies.

SOIL SAMPLING

Surface soil (soil collected immediately below vegetation and organic matter) and subsurface soil samples were collected from 17 locations along the proposed subsurface conduit corridors (in proximity to FTAs), including areas outside of the proposed excavation footprint (**Figure 2)**.

Soil borings were completed using direct-push technology and disposable acetate macro-core sleeves. Drilling services were provided by SJB Services Inc. of Hamburg, New York. Samples were collected using disposable equipment free of PFAS and transferred directly to the laboratory-supplied sample container. One surface sample and 1 subsurface soil sample were collected from each location. The surface soil samples were collected from soil immediately beneath vegetation. The subsurface soil samples were collected from the bottom of the macro-core between 2 to 4 feet (ft) below grade surface (bgs) at the interval indicated in the sample identification based on recovery of material. Soil cores were evaluated, and notable findings were recorded (color, soil type, recovery, etc.). Tabular field documentation is provided as **Attachment B**.

Groundwater was not encountered in soil borings during this event; and therefore, groundwater grab samples were not collected.

Quality Assurance/Quality Control

Quality assurance (QA)/quality control (QC) samples were collected to evaluate the sampling methods and monitor the laboratory analytical techniques. During the sampling event, four duplicate samples and one matrix spike/matrix spike duplicate sample were collected. Four equipment blanks and two field blanks were also collected.

The samples were labeled, handled, and packaged following the procedures described in the Work Plan. Samples were placed in appropriate sample containers, sealed, and submitted to the laboratory for analysis.

Laboratory Analyses

Samples were submitted to GEL Laboratories, LLC located in Charleston, South Carolina. GEL Laboratories, LLC is accredited by the Department of Defense Environmental Laboratory Accreditation Program for PFOA and PFOS by modified U.S. Environmental Protection Agency (EPA) Method 537. Analytical data reports are included as **Attachment C**.

Samples were analyzed for the full PFAS Target Analyte List, which includes the following compounds.

Compounds

PFOA	Perfluorodecanoic acid
PFOS	Perfluoroundecanoic acid
Perfluorobutanesulfonic acid	Perfluorododecanoic acid
Perfluorohexanesulfonic acid	Perfluorotridecanoic acid
Perfluoroheptanesulfonic acid	Perfluorotetradecanoic acid
Perfluorodecanesulfonic acid	6:2 Fluorotelomer sulfonate
Perfluorobutanoic acid	8:2 Fluorotelomer sulfonate
Perfluoropentanoic acid	Perfluorooctanesulfonamide
Perfluorohexanoic acid	N-methyl perfluorooctanesulfonamidoacetic acid
Perfluoroheptanoic acid	N-ethyl perfluorooctanesulfonamidoacetic acid
Perfluorononanoic acid	

Data Validation

The soil, groundwater, and QC data was reviewed upon receipt for completeness and quality. The laboratory results were evaluated for data usability in accordance with the Quality Assurance Project Plan (QAPP) section of the Workplan. An independent third-party data validator, EDS, Ltd. of Pittsburgh, Pennsylvania, provided a Data Usability Summary Report. The data was reviewed and validated based on an evaluation of the results in relation to the QAPP in conjunction with the EPA National Functional Guidelines. The QAPP specifies accuracy and precision objectives while the EPA National Functional Guidelines provide data usability guidelines.

Overall, quality of the data was acceptable. The data reported for the sampled media (soil) are considered accurate and usable as qualified for the intended purpose and to be representative of site conditions at the time of collection. The Data Usability Summary Report is included as **Attachment D**.

ANALYTICAL RESULTS

Analytical results were reported in nanograms per gram, which has a direct 1:1 ratio to micrograms per kilogram or parts per billion (ppb). The reported results were compared to screening criteria developed by the EPA and the New York State Department of Environmental Conservation (NYSDEC). Specifically, PFOA and PFOS have Environmental Protection Agency (EPA) screening criteria for soil at a concentration of 1,260 ppb. The New York State Department of Environmental Conservation employs a soil screening level of 1 ppb for PFOA and PFOS for imported soil. It is anticipated that future promulgated soil cleanup objectives for these compounds will be 1 ppb. No analytical results for surface soil or subsurface soil exceeded the EPA screening criteria. Surface soil analytical results are provided as **Table 1** and subsurface soil analytical results are provided as **Table 2**. Sample locations and analytical results for PFOA and PFOS are presented as **Figure 2**.

Surface Soil

Surface soil samples were collected from the interval directly beneath vegetation and organic matter. All 19 target analytes were detected at a concentration greater than the method detection limit in at least 1 sample. PFOS was detected in 16 of 17 surface soil samples and at concentrations ranging from 1.86 ppb (SB-16) to 938 ppb (SB-07). PFOA was detected in 14 of 17 surface soil samples and at concentrations ranging from 0.287 ppb (SS-17) to 16.9 ppb (SB-13).

Subsurface Soil

In subsurface soil samples, 15 analytes of the 19 target analytes were detected at a concentration greater than the method detection limit in at least 1 sample. PFOS was detected in 13 of 17 subsurface soil samples and at concentrations ranging from 0.387 ppb (SB-06) to 147 ppb (SB-09). PFOA was detected in 9 of 17 subsurface soil samples and at concentrations ranging from 0.287 ppb (SS-17) to 16.9 ppb (SB-13).

Quality Control

During the 2-day field event, four equipment rinse blanks, two field blanks, and two trip blanks were collected and analyzed for PFAS by modified EPA Method 537. No PFAS were detected in QA/QC samples collected.

SUMMARY

Samples collected in 2018 indicated detections in the area at concentrations exceeding soil, groundwater, and sediment guidelines. PFOS and PFOA were detected in soil samples collected during the November 2019 sampling event, but concentrations were less than the EPA screening criteria of 1,260 ppb. Concentrations of PFOS in surface soil samples exceeded 1 ppb in 16 of 17 samples and concentrations of PFOA in surface soil samples exceeded 1 ppb in 9 of 17 samples. The total concentrations of PFAS in surface soil ranged from 0.578 to 1,052 ppb and the greatest concentrations were observed in samples collected from SB-07, SB-09, SB-13, and SB-14, which are located in an area between the former and current FTA.

Concentrations of PFOS in subsurface soil samples exceeded 1 ppb in 10 of 17 samples and concentrations of PFOA in subsurface soil samples exceeded 1 ppb in 6 of 17 samples. The total concentrations of PFAS in subsurface soil ranged from 0.391 to 253.4 ppb and the greatest concentrations were observed in samples collected from SB-05, SB-09, SB-13, SB-14 and SB-15, which are adjacent to the current FTA.

Please do not hesitate to contact me at 315-565-6565 with any questions you might have regarding this report.

Sincerely,

EA SCIENCE AND TECHNOLOGY

Christopher Schroer
Project Manager

EA ENGINEERING, P.C.

Donald Conan, P.E., P.G.
Vice President

Figures

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2	Sample Locations and PFOS/PFOA Results

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1	Summary of Detected Perfluorinated Compounds in Surface Soil
2	Summary of Detected Perfluorinated Compounds in Subsurface Soil

Attachments

A	Underground Utility Survey
B	Field Documentation
C	Laboratory Analytical Data
D	Data Usability Summary Report

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Figures

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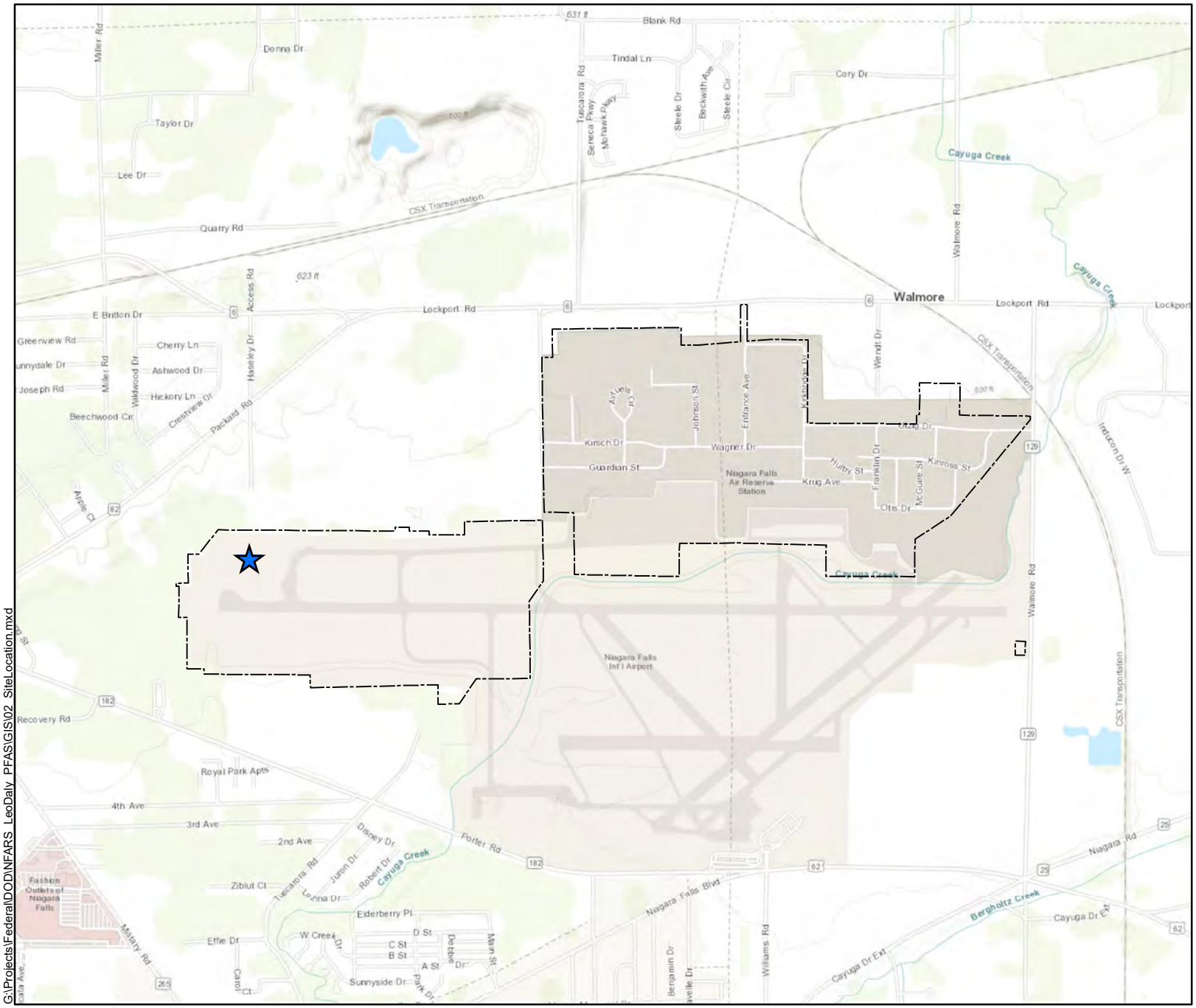
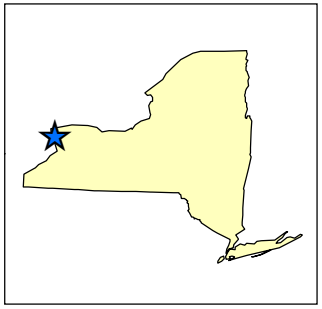


VICINITY MAP



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Legend

- Project Location
- Installation Perimeter

Figure 1
Site Location
Niagara Falls Air Reserve Station
Niagara Falls, New York

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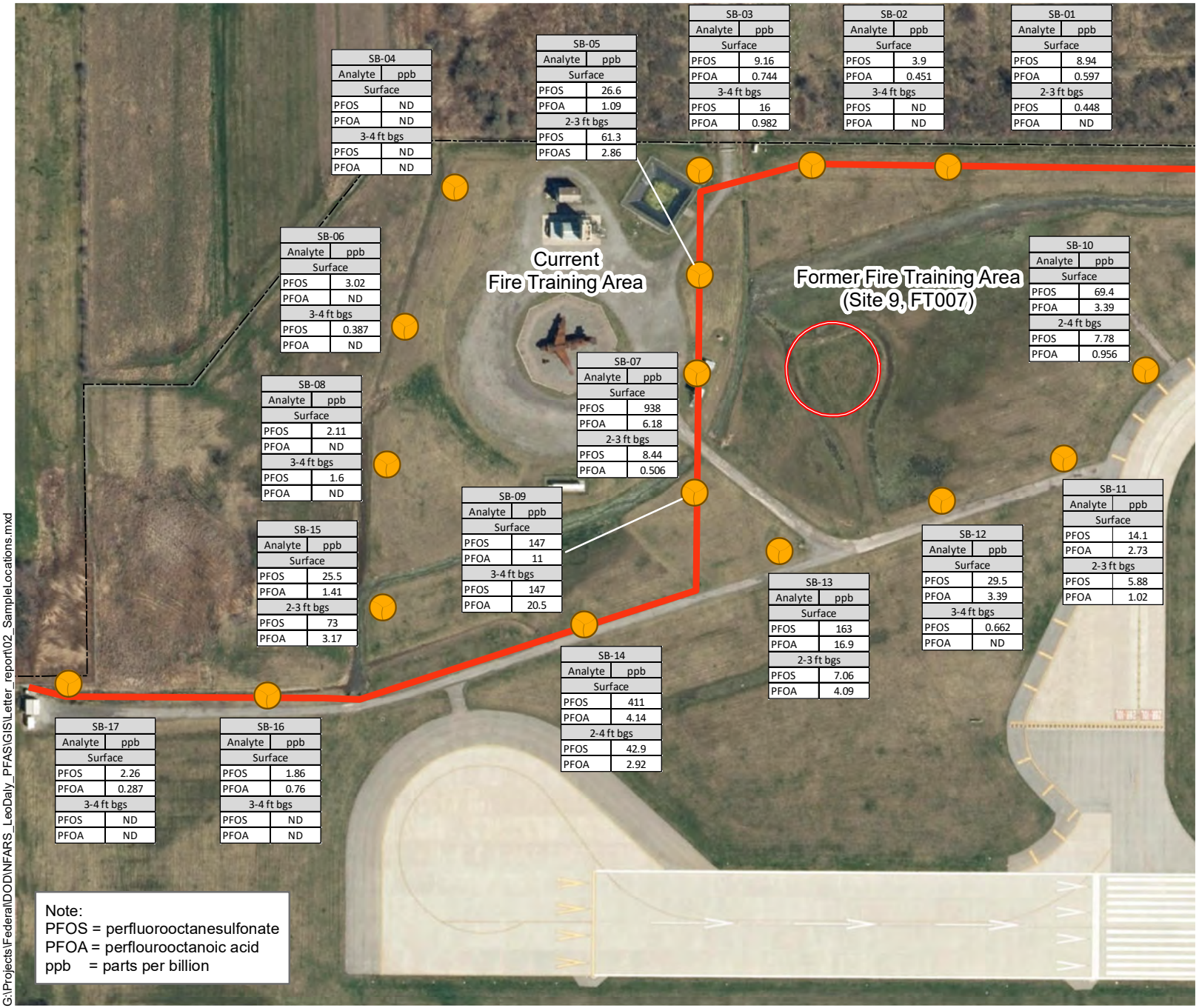

VICINITY MAP

N

Legend

- Soil Boring Locations
- Former Fire Training Area Site 9 (FT007)
- Proposed Conduit Location

Figure 2
Sample Locations and PFOS/PFOA Results
Niagara Falls Air Reserve Station
Niagara Falls, New York

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Tables

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Table 1 Summary of Perfluorinated Compounds Detected in Surface Soil

Parameter List E537	Location ID	NFARS-FTA-2019-SS01		NFARS-FTA-2019-SS02		NFARS-FTA-2019-SS03		NFARS-FTA-2019-SS04		NFARS-FTA-2019-SS05		NFARS-FTA-2019-SS06		NFARS-FTA-2019-SS07		NFARS-FTA-2019-SS08		NFARS-FTA-2019-SS09		Guidance Values	
	Laboratory ID	496267001		496267003		496267005		496267007		496267009		496267011		496267013		496267015		496267017			
	Sample Type	Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil			
	Sample Date	11/12/2019		11/12/2019		11/12/2019		11/12/2019		11/12/2019		11/12/2019		11/12/2019		11/12/2019		11/12/2019			
FLUOROTELOMER SULFONATE 6:2 (6:2 FTS)	ng/g	(<0.467)	U	(<0.408)	U	(<0.442)	U	(<0.412)	U	1.27		(<0.405)	U	0.838	J	(<0.467)	U	(<0.455)	U	---	---
FLUOROTELOMER SULFONATE 8:2 (8:2 FTS)	ng/g	(<0.461)	U	(<0.403)	U	(<0.436)	U	(<0.407)	U	(<0.4)	U	(<0.4)	U	(<0.414)	U	(<0.461)	U	(<0.449)	U	---	---
PERFLUOROBUTANESULFONATE (PFBS)	ng/g	(<0.197)	U	(<0.173)	U	(<0.187)	U	(<0.174)	U	0.53		1.03		3.08		(<0.197)	U	1.18		---	---
PERFLUOROBUTYRIC ACID (PFBA)	ng/g	0.608		0.363	J	0.683		0.264	J	0.694		0.359	J	2.7		0.409	J	1.07		---	---
PERFLUORODECANESULFONATE (PFDS)	ng/g	(<0.197)	U	(<0.173)	U	(<0.187)	U	(<0.174)	U	(<0.171)	U	(<0.172)	U	3.18		(<0.197)	U	(<0.192)	U	---	---
PERFLUORODECANOIC ACID (PFDA)	ng/g	(<0.443)	U	(<0.387)	U	(<0.419)	U	(<0.391)	U	(<0.384)	U	(<0.385)	U	3.03		(<0.443)	U	(<0.432)	U	---	---
PERFLUORODODECANOIC ACID (PFDOA)	ng/g	(<0.197)	U	(<0.173)	U	(<0.187)	U	(<0.174)	U	(<0.171)	U	(<0.172)	U	0.608		(<0.197)	U	(<0.192)	U	---	---
PERFLUOROHEPTANESULFONATE (PFHPS)	ng/g	(<0.221)	U	(<0.194)	U	(<0.21)	U	(<0.195)	U	0.383	J	(<0.192)	U	11		(<0.221)	U	2.24		---	---
PERFLUOROHEPTANOIC ACID (PFHPA)	ng/g	0.329	J	(<0.173)	U	0.553	J	(<0.174)	U	0.76		(<0.172)	U	4.99		(<0.197)	U	3.79		---	---
PERFLUOROHEXANESULFONATE (PFHXS)	ng/g	2.22		2.52		2.81		0.314	J	8.88		8.73		51.4		2.35		25.4		---	---
PERFLUOROHEXANOIC ACID (PFHXA)	ng/g	0.92		0.505	J	1.24		(<0.211)	U	2.41		0.299	J	8.25		0.329	J	3.34		---	---
PERFLUORONONANOIC ACID (PFNA)	ng/g	(<0.197)	U	(<0.173)	U	(<0.187)	U	(<0.174)	U	0.31	J	(<0.172)	U	3.52		(<0.197)	U	6.24		---	---
PERFLUOROOCTANESULFONAMIDE (PFOSA)	ng/g	(<0.197)	U	(<0.173)	U	(<0.187)	U	(<0.174)	U	(<0.171)	U	(<0.172)	U	1.46		(<0.197)	U	(<0.192)	U	---	---
PERFLUOROOCTANESULFONATE (PFOS)	ng/g	8.94		3.9		9.16		(<0.211)	U	26.6		3.02		938		2.11		147		1,260 [1]	1 [2]
PERFLUOROOCTANOIC ACID (PFOA)	ng/g	0.597	J	0.451	J	0.744		(<0.211)	U	1.09		(<0.208)	U	6.18		(<0.239)	U	11		1,260 [1]	1 [2]
PERFLUOROPENTANOIC ACID (PFPEA)	ng/g	0.478	J	0.186	J	1.19		(<0.174)	U	2.87		0.226	J	11.6		0.199	J	2.84		---	---
PERFLUOROTETRADECANOIC ACID (PFTEDA)	ng/g	(<0.239)	U	(<0.209)	U	(<0.227)	U	(<0.211)	U	(<0.208)	U	(<0.208)	U	0.221	J	(<0.239)	U	(<0.233)	U	---	---
PERFLUOROTRIDECANOIC ACID (PFTRDA)	ng/g	(<0.197)	U	(<0.173)	U	(<0.187)	U	(<0.174)	U	(<0.171)	U	(<0.172)	U	0.215	J	(<0.197)	U	(<0.192)	U	---	---
PERFLUOROUNDECANOIC ACID (PFUDA)	ng/g	(<0.197)	U	(<0.173)	U	(<0.187)	U	(<0.174)	U	(<0.171)	U	(<0.172)	U	1.54		(<0.197)	U	(<0.192)	U	---	---

Parameter List E537	Location ID	NFARS-FTA-2019-SS10		NFARS-FTA-2019-SS11		NFARS-FTA-2019-SS12		NFARS-FTA-2019-SS13		NFARS-FTA-2019-SS14		NFARS-FTA-2019-SS15		NFARS-FTA-2019-SS16		NFARS-FTA-2019-SS17		Guidance Values	
	Laboratory ID	496272001		496272002		496272004		496272006		496272008		496272010		496272012		496272014			
	Sample Type	Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil			
	Sample Date	11/12/2019		11/12/2019		11/12/2019		11/12/2019		11/13/2019		11/13/2019		11/13/2019		11/13/2019			
FLUOROTELOMER SULFONATE 6:2 (6:2 FTS)	ng/g	(<0.406)	UJ	0.392	J	1.9		17.8		2.12		8.92		(<0.466)	U	(<0.493)	U	---	---
FLUOROTELOMER SULFONATE 8:2 (8:2 FTS)	ng/g	(<0.401)	UJ	(<0.385)	U	1.46		17.2		(<0.402)	U	(<0.432)	U	(<0.46)	U	(<0.487)	U	---	---
PERFLUOROBUTANESULFONATE (PFBS)	ng/g	0.495	J	2.81		0.681		7.85		0.496	J	0.275	J	(<0.197)	U	(<0.209)	U	---	---
PERFLUOROBUTYRIC ACID (PFBA)	ng/g	1.73	J	1.88		1.83		1.76		2.16		0.452	J	0.452	J	0.373	J	---	---
PERFLUORODECANESULFONATE (PFDS)	ng/g	(<0.172)	UJ	(<0.165)	U	(<0.151)	U	0.168	J	0.491	J	(<0.185)	U	(<0.197)	U	(<0.209)	U	---	---
PERFLUORODECANOIC ACID (PFDA)	ng/g	(<0.386)	UJ	(<0.37)	U	(<0.338)	U	0.371	J	(<0.386)	U	(<0.415)	U	(<0.442)	U	(<0.468)	U	---	---
PERFLUORODODECANOIC ACID (PFDOA)	ng/g	(<0.172)	UJ	(<0.165)	U	(<0.151)	U	(<0.159)	U	(<0.172)	U	(<0.185)	U	(<0.197)	U	(<0.209)	U	---	---
PERFLUOROHEPTANESULFONATE (PFHPS)	ng/g	0.794		0.419	J	0.508		2.76		3.38		0.259	J	(<0.221)	U	(<0.234)	U	---	---
PERFLUOROHEPTANOIC ACID (PFHPA)	ng/g	0.964		3.1		3.23		16.1		1.35		0.624		0.283	J	(<0.209)	U	---	---
PERFLUOROHEXANESULFONATE (PFHXS)	ng/g	21.6	J	21.7		3.99		30.4		11.3		4.66		1.27		0.914		---	---
PERFLUOROHEXANOIC ACID (PFHXA)	ng/g	4.57		6.83		6.05		20.5		3.6		0.908		0.553	J	0.377	J	---	---
PERFLUORONONANOIC ACID (PFNA)	ng/g	1.04	J	0.241	J	0.288	J	3.49		3.7		0.418	J	(<0.197)	U	(<0.209)	U	---	---
PERFLUOROOCTANESULFONAMIDE (PFOSA)	ng/g	(<0.172)	U	(<0.165)	U	(<0.151)	U	0.387	J	0.393	J	(<0.185)	U	(<0.197)	U	(<0.209)	U	---	---
PERFLUOROOCTANESULFONATE (PFOS)	ng/g	69.4	J	14.1		29.5		163		411		25.5		1.86		2.26		1,260 [1]	1 [2]
PERFLUOROOCTANOIC ACID (PFOA)	ng/g	3.39		2.73		3.39		16.9		4.14		1.41		0.76		0.287	J	1,260 [1]	1 [2]
PERFLUOROPENTANOIC ACID (PFPEA)	ng/g	3.48		5.14		7.7		15.9		4.1		0.683		0.296	J	0.215	J	---	---
PERFLUOROTETRADECANOIC ACID (PFTEDA)	ng/g	(<0.208)	UJ	(<0.2)	U	(<0.183)	U	(<0.192)	U	(<0.209)	U	(<0.224)	U	(<0.239)	U	(<0.253)	U	---	---
PERFLUOROTRIDECANOIC ACID (PFTRDA)	ng/g	(<0.172)	U	(<0.165)	U	(<0.151)	U	0.169	J	(<0.172)	U	(<0.185)	U	(<0.197)	U	(<0.209)	U	---	---
PERFLUOROUNDECANOIC ACID (PFUDA)	ng/g	(<0.172)	UJ	(<0.165)	U	(<0.151)	U	0.344	J	0.219	J	(<0.185)	U	(<0.197)	U	(<0.209)	U	---	---

NOTES:

[1] Environmental Protection Agency Screening Criteria (µg/kg).

[2] New York State Department of Environmental Conservation Imported Soil Screening Criteria (µg/kg).

--- = No screening criteria.

U = The analyte was analyzed for, but was not detected above the sample reporting limit.

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

ng/g = Nanogram(s) per gram = micrograms per kilogram (µg/kg)

Values shown in **bold** exceed the guidance value indicated.

Data provided by GEL Laboratories, LLC.

Table 2 Summary of Perfluorinated Compounds Detected in Subsurface Soil

Parameter List E537	Location ID	NFARS-FTA-2019-SB01 (2-3)		NFARS-FTA-2019-SB02 (3-4)		NFARS-FTA-2019-SB03 (3-4)		NFARS-FTA-2019-SB04 (3-4)		NFARS-FTA-2019-SB05 (2-3)		NFARS-FTA-2019-SB06 (3-4)		NFARS-FTA-2019-SB07 (2-3)		NFARS-FTA-2019-SB08 (3-4)		NFARS-FTA-2019-SB09 (3-4)		Guidance Values	
	Laboratory ID	496267002		496267004		496267006		496267008		496267010		496267012		496267014		496267016		496267018			
	Sample Type	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil			
	Sample Date	11/12/2019		11/12/2019		11/12/2019		11/12/2019		11/12/2019		11/12/2019		11/12/2019		11/12/2019		11/12/2019			
FLUOROTELOMER SULFONATE 6:2 (6:2 FTS)	ng/g	(<0.459)	U	(<0.476)	U	(<0.419)	U	(<0.406)	U	(<0.442)	U	(<0.416)	U	(<0.391)	U	(<0.471)	U	(<0.425)	U	---	---
FLUOROTELOMER SULFONATE 8:2 (8:2 FTS)	ng/g	(<0.453)	U	(<0.469)	U	(<0.414)	U	(<0.401)	U	(<0.437)	U	(<0.411)	U	(<0.386)	U	(<0.465)	U	(<0.42)	U	---	---
PERFLUOROBUTANESULFONATE (PFBS)	ng/g	(<0.194)	U	(<0.201)	U	0.206	J	(<0.172)	U	0.535	J	1.53		1.9		0.363	J	2.84		---	---
PERFLUOROBUTYRIC ACID (PFBA)	ng/g	(<0.235)	U	(<0.244)	U	0.505	J	0.246	J	1.14		(<0.213)	U	0.775		0.379	J	1.86		---	---
PERFLUORODECANESULFONATE (PFDS)	ng/g	(<0.194)	U	(<0.201)	U	(<0.177)	U	(<0.172)	U	(<0.187)	U	(<0.176)	U	(<0.165)	U	(<0.199)	U	(<0.18)	U	---	---
PERFLUOROHEPTANESULFONATE (PFHPS)	ng/g	(<0.218)	U	(<0.226)	U	0.235	J	(<0.193)	U	0.697		(<0.197)	U	0.286	J	(<0.223)	U	5.47		---	---
PERFLUOROHEPTANOIC ACID (PFHPA)	ng/g	(<0.194)	U	(<0.201)	U	0.578		(<0.172)	U	0.838		(<0.176)	U	0.359	J	(<0.199)	U	5.51		---	---
PERFLUOROHEXANESULFONATE (PFHXS)	ng/g	0.755		0.391	J	3.86		(<0.172)	U	11.4		2.7		8.41		1.79		50.1		---	---
PERFLUOROHEXANOIC ACID (PFHXA)	ng/g	(<0.235)	U	(<0.244)	U	1.41		(<0.208)	U	2.52		(<0.213)	U	2.69		0.387	J	12.2		---	---
PERFLUORONONANOIC ACID (PFNA)	ng/g	(<0.194)	U	(<0.201)	U	0.247	J	(<0.172)	U	0.482	J	(<0.176)	U	(<0.165)	U	(<0.199)	U	2.15		---	---
PERFLUOROOCTANESULFONAMIDE (PFOSA)	ng/g	(<0.194)	U	(<0.201)	U	(<0.177)	U	(<0.172)	U	0.218	J	(<0.176)	U	(<0.165)	U	(<0.199)	U	(<0.18)	U	---	---
PERFLUOROOCTANESULFONATE (PFOS)	ng/g	0.448	J	(<0.244)	U	16		(<0.208)	U	61.3		0.387	J	8.44		1.6		147		1,260 [1]	1 [2]
PERFLUOROOCTANOIC ACID (PFOA)	ng/g	(<0.235)	U	(<0.244)	U	0.982		(<0.208)	U	2.86		(<0.213)	U	0.506		(<0.242)	U	20.5		1,260 [1]	1 [2]
PERFLUOROPENTANOIC ACID (PFPEA)	ng/g	(<0.194)	U	(<0.201)	U	1.24		(<0.172)	U	1.82		(<0.176)	U	1.86		0.332	J	5.78		---	---
PERFLUOROUNDECANOIC ACID (PFUDA)	ng/g	(<0.194)	U	(<0.201)	U	(<0.177)	U	(<0.172)	U	(<0.187)	U	(<0.176)	U	(<0.165)	U	(<0.199)	U	(<0.18)	U	---	---

Parameter List E537	Location ID	NFARS-FTA-2019-SB10 (3-4)		NFARS-FTA-2019-SB11 (2-3)		NFARS-FTA-2019-SB12 (3-4)		NFARS-FTA-2019-SB13 (2-3)		NFARS-FTA-2019-SB14 (2-4)		NFARS-FTA-2019-SB15 (2-3)		NFARS-FTA-2019-SB16 (3-4)		NFARS-FTA-2019-SB17 (3-4)		Guidance Values	
	Laboratory ID	496267019		496272003		496272005		496272007		496272009		496272011		496272013		496272015			
	Sample Type	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil			
	Sample Date	11/12/2019		11/12/2019		11/12/2019		11/12/2019		11/13/2019		11/13/2019		11/13/2019		11/13/2019			
FLUOROTELOMER SULFONATE 6:2 (6:2 FTS)	ng/g	(<0.454)	U	0.727	J	0.616	J	58		7.92		7.44		(<0.463)	U	0.724	J	---	---
FLUOROTELOMER SULFONATE 8:2 (8:2 FTS)	ng/g	(<0.448)	U	(<0.393)	U	(<0.381)	U	6.17		(<0.438)	U	0.514	J	(<0.457)	U	(<0.447)	U	---	---
PERFLUOROBUTANESULFONATE (PFBS)	ng/g	0.511	J	2.41		0.574		1.37		5.11		0.436	J	(<0.196)	U	(<0.191)	U	---	---
PERFLUOROBUTYRIC ACID (PFBA)	ng/g	0.526	J	0.804		0.713		1.52		0.973		1.16		0.283	J	0.236	J	---	---
PERFLUORODECANESULFONATE (PFDS)	ng/g	(<0.192)	U	(<0.168)	U	(<0.163)	U	(<0.194)	U	(<0.188)	U	0.276	J	(<0.196)	U	(<0.191)	U	---	---
PERFLUOROHEPTANESULFONATE (PFHPS)	ng/g	0.349	J	(<0.189)	U	(<0.183)	U	0.383	J	2.87		0.665		(<0.22)	U	(<0.215)	U	---	---
PERFLUOROHEPTANOIC ACID (PFHPA)	ng/g	0.479	J	1.22		(<0.163)	U	2.16		1.73		1.3		(<0.196)	U	(<0.191)	U	---	---
PERFLUOROHEXANESULFONATE (PFHXS)	ng/g	17.8		11.7		0.296	J	6.78		64.7		9.97		(<0.196)	U	(<0.191)	U	---	---
PERFLUOROHEXANOIC ACID (PFHXA)	ng/g	2.65		4.26		1.77		6.62		6.47		1.79		(<0.237)	U	(<0.232)	U	---	---
PERFLUORONONANOIC ACID (PFNA)	ng/g	(<0.192)	U	(<0.168)	U	(<0.163)	U	0.246	J	(<0.188)	U	1.91		(<0.196)	U	(<0.191)	U	---	---
PERFLUOROOCTANESULFONAMIDE (PFOSA)	ng/g	(<0.192)	U	(<0.168)	U	(<0.163)	U	(<0.194)	U	(<0.188)	U	0.512	J	(<0.196)	U	(<0.191)	U	---	---
PERFLUOROOCTANESULFONATE (PFOS)	ng/g	7.78		5.88		0.662		7.06		42.9		73		(<0.237)	U	(<0.232)	U	1,260 [1]	1 [2]
PERFLUOROOCTANOIC ACID (PFOA)	ng/g	0.956		1.02		(<0.198)	U	4.09		2.92		3.17		(<0.237)	U	(<0.232)	U	1,260 [1]	1 [2]
PERFLUOROPENTANOIC ACID (PFPEA)	ng/g	0.769		3.46		2.38		5.96		2.31		1.73		(<0.196)	U	(<0.191)	U	---	---
PERFLUOROUNDECANOIC ACID (PFUDA)	ng/g	(<0.192)	U	(<0.168)	U	(<0.163)	U	(<0.194)	U	(<0.188)	U	0.647		(<0.196)	U	(<0.191)	U	---	---

NOTES:
[1] Environmental Protection Agency Screening Criteria (µg/kg).
[2] New York State Department of Environmental Conservation Imported Soil Screening Criteria (µg/kg).
--- = No screening criteria.
U = The analyte was analyzed for, but was not detected above the sample reporting limit.
J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
ng/g = Nanogram(s) per gram = micrograms per kilogram (µg/kg)
Values shown in **bold** exceed the guidance value indicated.
Data provided by GEL Laboratories, LLC.

Attachment A

Underground Utility Survey

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NYLD Infrastructure

NEW YORK LEAK DETECTION, INC.
PO Box 269, Jamesville, NY 13078
315-469-4601 info@nyld.com

Field Report – Utility Location

Date(s) on site: 10/9 to 10/10/19

Technician: Nick Starr **Other Technicians on site:** N/A

Customer: EA Engineering Science & Technology

Site Address: 10405 Lockport Road, Niagara Falls, NY

Contact Person: Lindsay Mairs **Phone:** 716-243-6227

Scope of Work: Utility Location Services -- clear for 17 soil boring locations.

Type of Service: *mark all that apply*

☐ *Leak Detection*	☐ *Comprehensive Leak Survey*	☐ *Pressurized Pipe Inspection*
☐ *Infrastructure Assessment*	☒ *Utility Location/GPR*	☐ *Utility Mapping/AutoCAD*
☐ *EM Survey*	☐ *Video Inspection*	☐ *Valve Exercising*

Type of Equipment Used: *mark all that apply*

☐ *Profiler EMP 400*	☒ *RD8000 Pipe & Cable Locator*	☐ *MetroTech vLocPro2*
☐ *LC2500 Leak Correlator*	☒ *Noggin 250 MHz*	☐ *PosiTector UTG G3*
☐ *S-30 Surveyor*	☐ *Noggin 500 MHz*	☐ *Video Inspection Camera*
☐ *Sonde / Locatable Rodder*	☐ *Conquest 1000 MHz*	☐ *Helium # Bottles*
☐ *Leica Robotic Total Station*	☐ *Leica RTK GPS*	☐ *JD7 Investigator*
☐ *Valve Maintenance Trailer*	☐ *Thermal Imaging Camera*	☐ *ZCorr Data Loggers*

Marking Used: *mark all that apply*

☒ *Paint*	☒ *Flags*	☐ *Chalk/Marker*
☐ *Tape*	☐ *Updated Onsite Mapping*	☐ *Other* _____

NYLD **Infrastructure**

NEW YORK LEAK DETECTION, INC.
PO Box 269, Jamesville, NY 13078
315-469-4601 info@nyld.com

Field Report – Utility Location

Site Access/Safety Training: Visitor pass and escort **Expiration Date:** 10/10/19

Ground Cover/Weather Conditions: 10/9 – Sunny around 65 degrees. 10/10 – Sunny around 65 degrees.

Instructions from Onsite Contact: N/A

Information Transfer:

☒ *Information relayed on site to:*

Lindsay Mairs

In addition to this field report, mark all that apply:

☐ *Hand drawn sketch*
☐ *Maps updated onsite*
☐ *Photographs*
☐ *Surveyed by others*
☐ *Surveyed and AutoCAD Mapping by NYLD*

Notes/Testing Results:

A visual inspection was performed in the area of concern to assess for utility structures. Utilizing the RD8000 in conductive, inductive, and power/radio modes, located and marked out utilities as shown in the area below. Additional confirmation performed with the Noggin using the 250 and/or 500 MHz antenna. GPR signal reception varies depending upon soil conditions. Therefore, it is utilized in combination with various other geophysical tools for the most accurate verification of known/unknown utilities and/or structures.

Utilities were painted in appropriate color. Boring locations were marked with pink flags.

GPR imagery was scattered with shallow penetration. Extra caution should be used when drilling boring locations 3, 5, and 7 due to clustered utilities and the inability to trace the water line in the region.

Locations 1, 2, 3, 5, 7, 9, 16, and 17 were moved on site. All other locations were deemed clear.

A suspect communication/electric vault near locations 1 and 2 was unable to be accessed.

See imagery below for more information.

This report is back up to information relayed and marked on site at time of service. It is for informational purposes only.

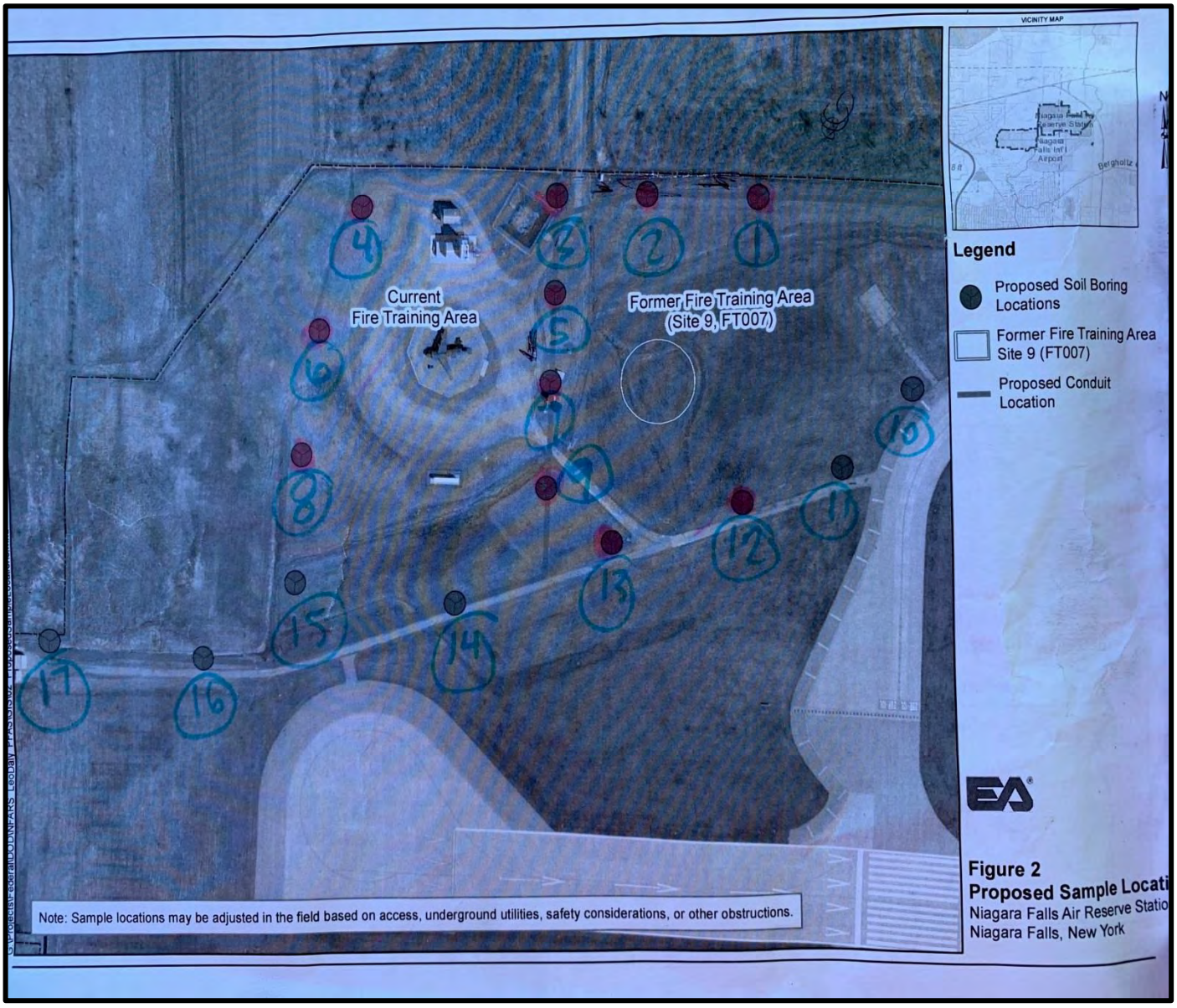
Key

Blue	Water
Red	Power
Orange	Communications
Yellow	Gas/Flammable Fuel
White	Unknown
Green	Storm/Sanitary

NYLD **Infrastructure**

NEW YORK LEAK DETECTION, INC.
PO Box 269, Jamesville, NY 13078
315-469-4601 info@nyld.com

Field Report – Utility Location



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Field Report – Utility Location

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Field Report – Utility Location

Subsurface Limitations

Utility locating is the art and science of using non-intrusive methods to search for, find and mark out buried, unseen conduits or other objects. There are innumerable variables involved in locating underground utilities, such as topography, size and complexity of job site, depth and proximity of buried utilities, above ground obstructions, short turnaround schedules, changes in the scope of work, lack of (or outdated) blueprints and adverse weather conditions.

New York Leak Detection, Inc. (NYLD) has made a substantial financial investment in crossover technologies and training to meet our clients' needs when locating and mapping utilities. However, due to unpredictable factors that may affect the results, NYLD makes no guarantee, expressed or implied, with respect to the completeness or accuracy of the information provided. Any use or reliance on the information or opinion is at the risk of the user and NYLD shall not be liable for any damage or injury arising out of the use or misuse of the information provided.

NYLD strives to provide the highest quality utility location services possible with the technical expertise of our field specialists and state-of-the-art equipment used. Every effort is made to provide our clients with the most accurate information possible without adverse consequences.

NYLD makes no guarantee that all subsurface utilities and obstructions will be detected. GPR signal penetration might not be sufficient to detect all utilities. NYLD is not responsible for detecting subsurface utilities and obstructions that normally cannot be detected by the methods employed or that cannot be detected because of site conditions. NYLD is not responsible for maintaining mark-outs after leaving the work area. Mark-outs made in inclement weather and in high traffic areas may not last. Surveyor assumes responsibility of picking up data on site.

Attachment B

Field Documentation

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DAILY FIELD REPORT **Day: Tuesday Date: 11/12/2019**

Project Name: Leo. A Daly
West End TACAN Repairs
PFAS Soil Sampling

Temperature: (F) 28-32

Wind Direction: SW, 8mph

Weather: Partly Cloudy (am)

Partly Cloudy (pm)

Arrive at site: 0715

Location: Niagara Falls, New York **Leave site:** 1600

HEALTH & SAFETY:

Are there any changes to the Health & Safety Plan? Yes ( ) No (x)
(If yes, list the deviation under items for concern)

Are monitoring results at acceptable levels?	Soil	Yes ( )	n/a (x)	* No ( )
	Water	Yes ( )	n/a (x)	* No ( )
	Air	Yes ( )	n/a (x)	* No ( )

If No, provide comments

OTHER ITEMS:

DESCRIPTION OF DAILY WORK PERFORMED:
L. Mairs (EA) onsite at 0715, met with Paris Laba to discuss activities. SJB on site 0900. A foot of snow is covering the locations that were previously marked out. We were able to uncover flags and markings SB-01 to SB-13.

Sampling

Sample ID:	Location/ Type	Time:	Date:	Note	Recovery	Description
NFARS-FTA-2019-	FB-01	945	11/12/2019			
NFARS-FTA-2019-	SS03	1000	11/12/2019		48/46	Top 3" topsoil/grass. 3" Brown SAND, some Silt, wet, 40" Brown SILT and SAND, trace Gravel, dry to moist.
NFARS-FTA-2019-	SB03 (3-4)	1005	11/12/2019			
NFARS-FTA-2019-	SS04	1015	11/12/2019		48/44	Top 3" topsoil/grass. 7" Brown, Silty SAND, trace Gravel, wet, 34" Brown SILT and SAND, trace Gravel, dry to moist.
NFARS-FTA-2019-	SB04 (3-4)	1020	11/12/2019			
NFARS-FTA-2019-	SS06	1045	11/12/2019	MS/MSD	48/48	Top 3" topsoil/grass. 45" Brown SILT and SAND, trace Gravel, dry to moist.
NFARS-FTA-2019-	SB06 (3-4)	1050	11/12/2019	FD		
NFARS-FTA-2019-	SS08	1105	11/12/2019	FD	48/47	Top 3" topsoil/grass. 4" Brown SAND, some Silt, wet, 40" Brown SILT and SAND, trace Gravel, dry to moist.
NFARS-FTA-2019-	SB08 (3-4)	1110	11/12/2019	FD		
NFARS-FTA-2019-	SS07	1130	11/12/2019		48/39	Top 3" topsoil/grass. 36" Brown SILT and SAND, trace Gravel, dry to moist.
NFARS-FTA-2019-	SB07 (2-3)	1135	11/12/2019			

NFARS-FTA-2019-	SS05	1200	11/12/2019		48/37	Top 3" topsoil/grass. 4" Brown SAND, some Silt, wet, 30" Brown SILT and SAND, trace Gravel, dry to moist.
NFARS-FTA-2019-	SB05 (2-3)	1205	11/12/2019			
NFARS-FTA-2019-	SS02	1230	11/12/2019		48/46	Top 3" topsoil/grass. 3" Brown SAND, some Silt, wet, 40" Brown SILT and SAND, trace Gravel, dry to moist.
NFARS-FTA-2019-	SB02 (3-4)	1235	11/12/2019			
NFARS-FTA-2019-	SS01	1255	11/12/2019		48/37	Top 3" topsoil/grass. 4" Brown SAND, some Silt, wet, 30" Brown SILT and SAND, trace Gravel, dry to moist.
NFARS-FTA-2019-	SB01 (2-3)	1300	11/12/2019			
NFARS-FTA-2019-	SS10	1350	11/12/2019	MS/MSD	48/48	Top 2" topsoil/grass. 4" Brown Silty SAND, some Gravel, wet, 42" Brown SILT and SAND, trace Gravel, dry to moist.
NFARS-FTA-2019-	SB10 (2-4)	1410	11/12/2019			
NFARS-FTA-2019-	SS11	1420	11/12/2019		48/32	Top 2" topsoil/grass. 6" Brown Silty SAND, some Gravel, wet, 24" Brown SILT and SAND, trace Gravel, dry to moist.
NFARS-FTA-2019-	SB11 (2-3)	1425	11/12/2019			
NFARS-FTA-2019-	SS12	1440	11/12/2019		48/43	Top 2" topsoil/grass. 7" Brown Silty SAND, some Gravel, wet, 34" Brown SILT and SAND, trace Gravel, dry to moist.
NFARS-FTA-2019-	SB12 (3-4)	1445	11/12/2019			
NFARS-FTA-2019-	SS13	1500	11/12/2019		48/37	Top 2" topsoil/grass. 5" Brown Silty SAND, some Gravel, wet, 30" Brown SILT and SAND, trace Gravel, dry to moist.
NFARS-FTA-2019-	SB13 (2-3)	1505	11/12/2019			
NFARS-FTA-2019-	SS09	1510	11/12/2019		48/46	Top 2" topsoil/grass. 4" Brown Silty SAND, some Gravel, wet, 42" Brown SILT and SAND, trace Gravel, dry to moist.
NFARS-FTA-2019-	SB09 (3-4)	1515	11/12/2019			
NFARS-FTA-2019-	EB-01	1520	11/12/2019	Geoprobe/Water level meter		
NFARS-FTA-2019-	EB-02	1525	11/12/2019	Macrocore/scoops		
NFARS-FTA-2019-	FD-01		11/12/2019	(SB06)		Field Duplicate
NFARS-FTA-2019-	FD-03		11/12/2019	(SB08)		Field Duplicate
NFARS-FTA-2019-	FD-02		11/12/2019	(SS08)		Field Duplicate

CONTRACTOR/SUBCONTRACTOR EQUIPMENT AND PERSONNEL ON SITE:

EA personnel: Lindsay Mairs

EA equipment: Disposable scoops, water level meter

Subcontractor personnel: SJB Services, Inc.

Subcontractor equipment:Geoprobe.

(*Indicates active equipment)

Other Subcontractors: None

VISITORS TO SITE:

None.

PROJECT SCHEDULE ISSUES:

None

PROJECT BUDGET ISSUES:

None

ITEMS OF CONCERN:

None

COMMENTS:

None

ATTACHMENT(S) TO THIS REPORT:

Photo Log

SITE REPRESENTATIVE:

Name: Lindsay Mairs

12 November 2019

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DAILY FIELD REPORT **Day: Wednesday Date: 11/13/2019**

Temperature: (F) 28-32

Wind Direction: S, 10 mph

Project Name: Leo. A Daly
West End TACAN Repairs
PFAS Soil Sampling

Weather: Partly Cloudy (am)

Partly Cloudy (pm)

Arrive at site: 0800

Location: Niagara Falls, New York **Leave site:** 1300

HEALTH & SAFETY:

Are there any changes to the Health & Safety Plan? Yes ( ) No (x)
(If yes, list the deviation under items for concern)

Are monitoring results at acceptable levels?	Soil	Yes ( )	n/a (x)	* No ( )
	Water	Yes ( )	n/a (x)	* No ( )
	Air	Yes ( )	n/a (x)	* No ( )

If No, provide comments

OTHER ITEMS:

DESCRIPTION OF DAILY WORK PERFORMED:
L. Mairs (EA) and SJB onsite at 0800, met with Paris Laba to discuss activities. Uncovered remaining four locations (SB-14 through -17) which were in the restricted area and required additional coordination with base personnel. Cleaned up site and transported one 55-gallon drum to the Base environmental storage area. There was approximately 17 gallons of IDW water with less than 10% methanol.

Sampling

Sample ID:	Location/ Type	Time:	Date:	Note	Recovery	Description
NFARS-FTA-2019-	FB-01	920	11/13/2019			
NFARS-FTA-2019-	SS14	935	11/13/2019		48/46	Top 2" topsoil/grass. 4" Brown Silty SAND, some Gravel, wet, 40" Brown SILT and SAND, trace Gravel, dry to moist.
NFARS-FTA-2019-	SB14 (2-4)	940	11/13/2019	FD		
NFARS-FTA-2019-	SS15	1010	11/13/2019		48/32	Top 2" topsoil/grass. 5" Brown Silty SAND, some Gravel, wet, 25" Brown SILT and SAND, trace Gravel, dry to moist.
NFARS-FTA-2019-	SB15 (2-3)	1015	11/13/2019			
NFARS-FTA-2019-	SS17	1035	11/13/2019		48/47	Top 2" topsoil/grass. 7" Brown Silty SAND, some Gravel, wet, 38" Brown SILT and SAND, trace Gravel, dry to moist.
NFARS-FTA-2019-	SB17 (3-4)	1040	11/13/2019			
NFARS-FTA-2019-	SS16	1100	11/13/2019		48/45	Top 2" topsoil/grass. 3" Brown Silty SAND, some Gravel, wet, 40" Brown SILT and SAND, trace Gravel, dry to moist.
NFARS-FTA-2019-	SB16 (3-4)	1105	11/13/2019			
NFARS-FTA-2019-	EB-03	1135	11/13/2019	Geoprobe/Water level meter		Equipment blank
NFARS-FTA-2019-	EB-04	1140	11/13/2019	Macrocore/scoops		Equipment blank
NFARS-FTA-2019-	FD-04		11/13/2019	(SB14)		Field Duplicate

DAILY FIELD REPORT Day: Wednesday Date: 11/13/2019

CONTRACTOR/SUBCONTRACTOR EQUIPMENT AND PERSONNEL ON SITE:

EA personnel: Lindsay Mairs

EA equipment: Disposable scoops, water level meter

Subcontractor personnel: SJB Services, Inc.

Subcontractor equipment:Geoprobe.

(*Indicates active equipment)

Other Subcontractors: None

VISITORS TO SITE:

None.

PROJECT SCHEDULE ISSUES:

None

PROJECT BUDGET ISSUES:

None

ITEMS OF CONCERN:

None

COMMENTS:

None

ATTACHMENT(S) TO THIS REPORT:

Photo Log

SITE REPRESENTATIVE:

Name: Lindsay Mairs

13 November 2019

Attachment C

Laboratory Analytical Data

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Packing Slip:

EA Engineering, Science, and Technology, Inc., PBC
NFARS West End Electrical
SDG: 496267
Attn:Lindsay Mairs

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DODQSM Cover Sheet

DOD-QSM Cover Sheet

NFARS West End Electrical

December 05, 2019

GEL Laboratories, LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Project Manager: Julie Robinson
Phone Extension: 4289
Email: Julie.Robinson@gel.com

Contract Purchase Order: 19623

Work Order: 496267 **SDG:** 496267

Client Contact:
Lindsay Mairs
EA Engineering, Science, and Technology, Inc., PBC
269 W. Jefferson Street
Syracuse, New York 13202

Project Identification: NFARS West End Electrical

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

GEL appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on November 14, 2019. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures. If you have any questions, please do not hesitate to contact me at the phone number or e-mail address listed above.

Sincerely,

Julie Robinson
Project Manager

Case Narrative

DODQSM Case Narrative
for
EA Engineering, Science, and Technology, Inc., PBC
SDG: 496267

December 05, 2019

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary

Sample Receipt The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on November 14, 2019 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

Laboratory ID	Client ID
496267001	NFARS-FTA-2019-SS01
496267002	NFARS-FTA-2019-SB01 (2-3)
496267003	NFARS-FTA-2019-SS02
496267004	NFARS-FTA-2019-SB02 (3-4)
496267005	NFARS-FTA-2019-SS03
496267006	NFARS-FTA-2019-SB03 (3-4)
496267007	NFARS-FTA-2019-SS04
496267008	NFARS-FTA-2019-SB04 (3-4)
496267009	NFARS-FTA-2019-SS05
496267010	NFARS-FTA-2019-SB05 (2-3)
496267011	NFARS-FTA-2019-SS06
496267012	NFARS-FTA-2019-SB06 (3-4)
496267013	NFARS-FTA-2019-SS07
496267014	NFARS-FTA-2019-SB07 (2-3)
496267015	NFARS-FTA-2019-SS08
496267016	NFARS-FTA-2019-SB08 (3-4)
496267017	NFARS-FTA-2019-SS09
496267018	NFARS-FTA-2019-SB09 (3-4)
496267019	NFARS-FTA-2019-SB10 (3-4)

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: LCMSMS-Misc.

Julie Robinson
Project Manager

Chain of Custody and Supporting Documentation

Cooler 1 of 2

Page: 1 of 5
Project # Leo Daly
GEL Quote #: EA(RVKQ19-0734)
COC Number (1): –
PO Number: 19623

496267
496272

GEL Laboratories LLC
Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

496277

GEL Work Order Number:
GEL Project Manager:

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: EA Engineering Phone # 716-243-6227
Project/Site Name: NFARS West End Project Fax # —
Address: Lockport Rd Niagara Falls, NY
Collected By: Lindsay Mairs Send Results To: lmairs@eaest.com

Sample Analysis Requested (5) (Fill in the number of containers for each test)

<-- Preservative Type (6)

Sample ID (* For composites - indicate start and stop date time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Should this sample be considered: Radioactive (Please supply isotopic info.)	(7) Known or possible hazards	Total number of containers	Full PFAS	target Analyte list PFA 21										Comments: Note: extra sample is required for sample specific QC
NFARS-FTA-2019-SS01	11/12/19	1255			Soil	No	No	1	X											
NFARS-FTA-2019-SB01 (2-3)		1300						1												
NFARS-FTA-2019-SS02		1230						1												
NFARS-FTA-2019-SB02 (3-4)		1235						1												
NFARS-FTA-2019-SS03		1000						1												
NFARS-FTA-2019-SB03 (3-4)		1005						1												
NFARS-FTA-2019-SS04		1015						1												
NFARS-FTA-2019-SB04 (3-4)		1020						1												
NFARS-FTA-2019-SS05		1200						1												
NFARS-FTA-2019-SB05 (2-3)	11/12/19	1205			Soil	No	No	1	X											

~~NFARS-FTA-2019~~

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1 Lindsay Mairs	11/13/19	1830	1 [signature]	11/14/19	9:10
2			2		
3			3		

TAT Requested: Normal: X Rush: ____ Specify: ________ (Subject to Surcharge)

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4

Additional Remarks: ERPIMS NYDEC EDD CAT B

For Lab Receiving Use Only: *Custody Seal Intact?* [ ] *Yes* [ ] *No* ***Cooler Temp:*** ____ °C

> ***For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)***

Sample Collection Time Zone: [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other: ________

1.) Chain of Custody Number = Client Determined

2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite

3.) Field Filtered: For liquid matrices, indicate with a - **Y** - for yes the sample was field filtered or - **N** - for sample was not field filtered.

4.) Matrix Codes: **DW**=Drinking Water, **GW**=Groundwater, **SW**=Surface Water, **WW**=Waste Water, **W**=Water, **ML**=Misc Liquid, **SO**=Soil, **SD**=Sediment, **SL**=Sludge, **SS**=Solid Waste, **O**=Oil, **F**=Filter, **P**=Wipe, **U**=Urine, **F**=Fecal, **N**=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B, 6010B/7470A**) and number of containers provided for each (i.e. *8260B* - **3**, *6010B 7470A* - **1**).

6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) *Are there any known or possible hazards associated with these samples?*

RCRA Metals
As = Arsenic **Hg**= Mercury
Ba = Barium **Se**= Selenium
Cd = Cadmium **Ag**= Silver
Cr = Chromium **MR**= Miscellaneous RCRA metals
Pb = Lead

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. *(i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)*

one Chain of Custody
two coolers

Page: 2 of 5
Project #: Leo Daly
GEL Quote #: EA (PRVKQ19-034)
COC Number (1): —
PO Number: 19623

GEL Laboratories LLC
Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics
gel.com

Chain of Custody and Analytical Request

GEL Work Order Number:
GEL Project Manager:

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: EA
Phone # 716-248-6227
Project/Site Name: NFARS Western
Fax #
Address: Sanul
Collected By: LM
Send Results To: lmars@eaest.com

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Should this sample be considered: Radioactive (Please supply isotopic info.)	Should this sample be considered: (7) Known or possible hazards	Total number of containers	Full PFAS Target Analyte List + EPA 537	<-- Preservative Type (6)	Comments
NFARS-FTA-2019-SS06	11/12/19	1045	MS/MSD		Soil	No	No	3	X		Note: extra sample is required for sample specific QC
NFARS-FTA-2019-SB06 (3-4)		1050						1			
NFARS-FTA-2019-SS07		1130						1			
NFARS-FTA-2019-SB07 (2-3)		1135						1			
NFARS-FTA-2019-SS08		1105						1			
NFARS-FTA-2019-SB08 (3-4)		1110						1			
NFARS-FTA-2019-SS09		1510						1			
NFARS-FTA-2019-SB09 (3-4)		1515						1			
NFARS-FTA-2019-SS10		1350	MS/MSD					3			
NFARS-FTA-2019-SB10 (3-4)	11/12/19	1400			Soil	No	No	1	X		

~~NFARS-FTA-2019~~

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1	11/13/19	1800	1 A. Ulmer	11/14/19	9:10
2			2		
3			3		

TAT Requested: Normal: X Rush: ____ Specify: ____ (Subject to Surcharge)

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4

Additional Remarks: EDRAMS NYSDEC EDD CAT B

For Lab Receiving Use Only: *Custody Seal Intact?* [ ] Yes [ ] No **Cooler Temp:** ____ °C

> ***For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)***

Sample Collection Time Zone: [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other: ____

1.) Chain of Custody Number = Client Determined

2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite

3.) Field Filtered: For liquid matrices, indicate with a **- Y -** for yes the sample was field filtered or **- N -** for sample was not field filtered.

4.) Matrix Codes: **DW**=Drinking Water, **GW**=Groundwater, **SW**=Surface Water, **WW**=Waste Water, **W**=Water, **ML**=Misc Liquid, **SO**=Soil, **SD**=Sediment, **SL**=Sludge, **SS**=Solid Waste, **O**=Oil, **F**=Filter, **P**=Wipe, **U**=Urine, **F**=Fecal, **N**=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B, 6010B/7470A**) and number of containers provided for each (i.e. *8260B* - **3**, *6010B 7470A* - **1**).

6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) *Are there any known or possible hazards associated with these samples?*

RCRA Metals
As = Arsenic **Hg**= Mercury
Ba = Barium **Se**= Selenium
Cd = Cadmium **Ag**= Silver
Cr = Chromium **MR**= Miscellaneous
Pb = Lead RCRA metals

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. *(i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)*

Page: 3 of 5
Project #: Leo Daly
GEL Quote #: Same
COC Number [1]: —
PO Number: 19623

GEL Laboratories LLC — Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics — gel.com

Chain of Custody and Analytical Request

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

GEL Work Order Number: *GEL Project Manager:*

Client Name: EA   Phone # 716-243-6227
Project/Site Name: NFARS   Fax # —
Address: Same
Collected By: LM   Send Results To: lmarks@eaest

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Radioactive (Please supply isotopic info.)	(7) Known or possible hazards	Total number of containers	Full PFAS	Target Analyte List EPA 537									Comments
NFARS-FTA-2019-SS11	11/12/19	1420			Soil	No	No	1	X										
NFARS-FTA-2019-SB11 (2-3)	↓	1425			↓	↓	↓	1	↓										
NFARS-FTA-2019-SS12	↓	1440			↓	↓	↓	1	↓										
NFARS-FTA-2019-SB12 (3-4)	↓	1445			↓	↓	↓	1	↓										
NFARS-FTA-2019-SS13	↓	1500			↓	↓	↓	1	↓										
NFARS-FTA-2019-SB13 (2-3)	11/12/19	1505			↓	↓	↓	1	↓										
NFARS-FTA-2019-SS14	11/13/19	0935			↓	↓	↓	1	↓										
NFARS-FTA-2019-SB14 (2-4)	11/13/19	0940			↓	↓	↓	1	↓										
NFARS-FTA-2019-SS15	11/13/19	1010			↓	↓	↓	1	↓										
NFARS-FTA-2019-SB15 (2-3)	11/13/19	1015			Soil	No	No	1	X										

Note: extra sample is required for sample specific QC
<-- Preservative Type (6)

Chain of Custody Signatures

	Relinquished By (Signed)	Date	Time		Received by (signed)	Date	Time
1	[signature]	11/13/19	1030	1	[signature]	11/14/19	9:10
2				2			
3				3			

TAT Requested: Normal: X Rush: ____ Specify: ________ **(Subject to Surcharge)**
Fax Results: [ ] Yes [ ] No
Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4
Additional Remarks: ERPIMS NYSDEC EDD CAT B
For Lab Receiving Use Only: *Custody Seal Intact?* [ ] *Yes* [ ] *No* ***Cooler Temp:*** ____ °C

> For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)
Sample Collection Time Zone: [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other: ________

1.) Chain of Custody Number = Client Determined
2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite
3.) Field Filtered: For liquid matrices, indicate with a - **Y** - for yes the sample was field filtered or - **N** - for sample was not field filtered.
4.) Matrix Codes: **DW**=Drinking Water, **GW**=Groundwater, **SW**=Surface Water, **WW**=Waste Water, **W**=Water, **ML**=Misc Liquid, **SO**=Soil, **SD**=Sediment, **SL**=Sludge, **SS**=Solid Waste, **O**=Oil, **F**=Filter, **P**=Wipe, **U**=Urine, **F**=Fecal, **N**=Nasal
5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B, 6010B/7470A**) and number of containers provided for each (i.e. *8260B* - **3**, *6010B 7470A* - **1**).
6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) *Are there any known or possible hazards associated with these samples?*

RCRA Metals
As = Arsenic **Hg**= Mercury
Ba = Barium **Se**= Selenium
Cd = Cadmium **Ag**= Silver
Cr = Chromium **MR**= Miscellaneous RCRA metals
Pb = Lead

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. *(i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)*
One chain of custody two coolers

Page: 4 of 5
Project #
GEL Quote #: Game
COC Number [1]:
PO Number: 19623

GEL Laboratories LLC
Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

GEL Work Order Number:
GEL Project Manager:

Client Name: EA
Phone # 716-2436227
Project/Site Name: NFARS West End
Fax # —
Address: Same
Collected By: LM
Send Results To: lmairs@eaest.com

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Radioactive (Please supply isotopic info.)	(7) Known or possible hazards	Total number of containers	XEPA-Full	Target Analyte	1st EPA 537	Comments (Note: extra sample is required for sample specific QC)
NFARS-FTA-2019-SS16	11/13/19	1100			SOIL	No	No	1	X			
NFARS-FTA-2019-SB16 (3-4)	11/13/19	1105						1				
NFARS-FTA-2019-SS17	11/13/19	1035						1				
NFARS-FTA-2019-SB17 (3-4)	11/13/19	1040						1				
NFARS-FTA-2019-S-FD01	11/12/19	—	FD					1				
NFARS-FTA-2019-S-FD02	11/12/19	—	FD					1				
NFARS-FTA-2019-S-FD03	11/12/19	—	FD					1				
NFARS-FTA-2019-S-FD04	11/13/19	—	FD		SOIL			1				
NFARS-FTA-2019-EB-01	11/12/19	1520	EB		W			2				Equipment Blank
NFARS-FTA-2019-EB-02	11/12/19	1525	EB		W	No	No	2	X			Equipment Blank

<-- Preservative Type (6)

Chain of Custody Signatures

	Relinquished By (Signed)	Date	Time		Received by (signed)	Date	Time
1	[signature]	11/13/19	1830	1	[signature]	11/14/19	9:10
2				2			
3				3			

TAT Requested: Normal: X Rush: ____ Specify: ________ (Subject to Surcharge)

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4

Additional Remarks: ERPIMS, NYSDEC EDD CAT B

For Lab Receiving Use Only: Custody Seal Intact? [ ] Yes [ ] No Cooler Temp: ____ °C

> For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)

Sample Collection Time Zone: [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other: ________

1.) Chain of Custody Number = Client Determined

2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite

3.) Field Filtered: For liquid matrices, indicate with a - **Y** - for yes the sample was field filtered or - **N** - for sample was not field filtered.

4.) Matrix Codes: **DW**=Drinking Water, **GW**=Groundwater, **SW**=Surface Water, **WW**=Waste Water, **W**=Water, **ML**=Misc Liquid, **SO**=Soil, **SD**=Sediment, **SL**=Sludge, **SS**=Solid Waste, **O**=Oil, **F**=Filter, **P**=Wipe, **U**=Urine, **F**=Fecal, **N**=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B, 6010B/7470A**) and number of containers provided for each (i.e. *8260B* - **3**, *6010B 7470A* - **1**).

6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) *Are there any known or possible hazards associated with these samples?*

RCRA Metals
As = Arsenic **Hg**= Mercury
Ba = Barium **Se**= Selenium
Cd = Cadmium **Ag**= Silver
Cr = Chromium **MR**= Miscellaneous RCRA metals
Pb = Lead

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. (i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)

Page: 5 of 5
Project # Leo Daly
GEL Quote #: SAME
COC Number (1):
PO Number: 19623

GEL Laboratories LLC
gel.com | Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

GEL Work Order Number: GEL Project Manager:

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: EA Phone # 716-243-6225
Project/Site Name: NFARS West End Fax #
Address: Same
Collected By: LM Send Results To: lmarsh@peaest.com

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Should this sample be considered: Radioactive (Please supply isotopic info.)	Should this sample be considered: (7) Known or possible hazards	Total number of containers	EPA 6010 Full Analytes List	EPA 537	<-- Preservative Type (6)	Comments
NFARS-FTA-2019-EB-03	11/13/19	1135	EB		W	No	No	2	X			Equipment Blank
NFARS-FTA-2019-EB-04	11/13/19	1140	EB		W			2				Equipment Blank
NFARS-FTA-2019TB-01	11/12/19	0800	TB		W			2				Trip Blank
NFARS-FTA-2019TB-02	11/13/19	0800	TB		W			2				Trip Blank
NFARS-FTA-2019FB-01	11/12/19	0945	FB		W			2				Field Blank
NFARS-FTA-2019FB-02	11/13/19	0920	FB		W	No	No	2	X			Field Blank

Chain of Custody Signatures

	Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1		11/13/19	1830	A. Allen	11/14/19	9:10
2						
3						

TAT Requested: Normal: ____ Rush: ____ Specify: ____ (Subject to Surcharge)

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4

Additional Remarks:

For Lab Receiving Use Only: *Custody Seal Intact?* [ ] *Yes* [ ] *No* ***Cooler Temp:*** ____ °C

> ***For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)***

Sample Collection Time Zone: [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other: ____

1.) Chain of Custody Number = Client Determined

2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite

3.) Field Filtered: For liquid matrices, indicate with a **- Y -** for yes the sample was field filtered or **- N -** for sample was not field filtered.

4.) Matrix Codes: **DW**=Drinking Water, **GW**=Groundwater, **SW**=Surface Water, **WW**=Waste Water, **W**=Water, **ML**=Misc Liquid, **SO**=Soil, **SD**=Sediment, **SL**=Sludge, **SS**=Solid Waste, **O**=Oil, **F**=Filter, **P**=Wipe, **U**=Urine, **F**=Fecal, **N**=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B**, **6010B/7470A**) and number of containers provided for each (i.e. *8260B* **- 3**, *6010B 7470A* **- 1**).

6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) *Are there any known or possible hazards associated with these samples?*

RCRA Metals
As = Arsenic **Hg**= Mercury
Ba = Barium **Se**= Selenium
Cd = Cadmium **Ag**= Silver
Cr = Chromium **MR**= Miscellaneous
Pb = Lead RCRA metals

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. *(i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)*

496 267
496 272
496 277

GEL Laboratories LLC

JH

SAMPLE RECEIPT & REVIEW FORM

Client: ESAT	**SDG/AR/COC/Work Order:**
Received By: AJA	**Date Received:** 11/14/19
Carrier and Tracking Number	Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other 7780 1186 4257 (2 coolers)

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#: If UN2910, Is the Radioactive Shipment Survey Compliant? Yes___ No___
B) Did the client designate the samples are to be received as radioactive?		✓	COC notation or radioactive stickers on containers equal client designation.
C) Did the RSO classify the samples as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3
D) Did the client designate samples are hazardous?		✓	COC notation or hazard labels on containers equal client designation.
E) Did the RSO identify possible hazards?		✓	If D or E is yes, select Hazards below. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	✓			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	✓			Preservation Method: Wet Ice Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP: 1°
4	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: IR4-16 Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?			✓	Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?			✓	If Yes, are Encores or Soil Kits present for solids? Yes___ No___ NA___(If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes___ No___ NA___(If unknown, select No) Are liquid VOA vials free of headspace? Yes___ No___ NA___ Sample ID's and containers affected:
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	✓			Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided?	✓			
13	COC form is properly signed in relinquished/received sections?	✓			Circle Applicable: Not relinquished Other (describe)

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials SH Date 11/14/19 Page 1 of 1

GL-CHL-SR-001 Rev 6

List of current GEL Certifications as of 05 December 2019

State	Certification
Alaska	17−018
Alaska Drinking Water	SC00012
Arkansas	88−0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH−0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330−15−00283, P330−15−00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C−SC−01
Kansas NELAP	E−10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2019020
Maryland	270
Massachusetts	M−SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE−OS−26−13
Nevada	SC000122020−1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R−158
Oklahoma	2019−165
Pennsylvania NELAP	68−00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235−19−15
Utah NELAP	SC000122019−29
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

LC-MS/MS Analysis

Case Narrative

LCMSMS-Misc
Technical Case Narrative
EA Engineering, Science, and Technology, Inc., PBC
SDG #: 496267

Product: **The Extraction and Analysis of Per and Polyfluroalkyl Substances Using LCMSMS**
Analytical Method: EPA 537.1 Mod, PFAS, Compliant with QSM Table B-15
Analytical Procedure: GL-OA-E-076 REV# 8
Analytical Batch: 1939152

Preparation Method: EPA 537.1 Modified
Preparation Procedure: GL-OA-E-076 REV# 8
Preparation Batch: 1939148

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
496267001	NFARS-FTA-2019-SS01
496267002	NFARS-FTA-2019-SB01 (2-3)
496267003	NFARS-FTA-2019-SS02
496267004	NFARS-FTA-2019-SB02 (3-4)
496267005	NFARS-FTA-2019-SS03
496267006	NFARS-FTA-2019-SB03 (3-4)
496267007	NFARS-FTA-2019-SS04
496267008	NFARS-FTA-2019-SB04 (3-4)
496267009	NFARS-FTA-2019-SS05
496267010	NFARS-FTA-2019-SB05 (2-3)
496267011	NFARS-FTA-2019-SS06
496267012	NFARS-FTA-2019-SB06 (3-4)
496267013	NFARS-FTA-2019-SS07
496267014	NFARS-FTA-2019-SB07 (2-3)
496267015	NFARS-FTA-2019-SS08
496267016	NFARS-FTA-2019-SB08 (3-4)
496267017	NFARS-FTA-2019-SS09
496267018	NFARS-FTA-2019-SB09 (3-4)
496267019	NFARS-FTA-2019-SB10 (3-4)
1204432749	Method Blank (MB)
1204432750	Laboratory Control Sample (LCS)
1204432751	496267011(NFARS-FTA-2019-SS06) Matrix Spike (MS)
1204432752	496267011(NFARS-FTA-2019-SS06) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Sample Dilutions

The following samples were diluted to bring the over range concentrations within the calibration range. 1204432751 (NFARS-FTA-2019-SS06MS), 1204432752 (NFARS-FTA-2019-SS06MSD), 496267010 (NFARS-FTA-2019-SB05 (2-3)), 496267013 (NFARS-FTA-2019-SS07) and 496267018 (NFARS-FTA-2019-SB09 (3-4)).

Analyte	496267			
	010	**013**	**017**	**018**
Perfluorohexanesulfonate (PFHxS)	1X	1X	1X	10X
Perfluorooctanesulfonate (PFOS)	5X	50X	10X	10X

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Qualifier Definition Report
for

ESAT001 EA Engineering, Science, and Technology, Inc., PBC

Client SDG: 496267 GEL Work Order: 496267

The Qualifiers in this report are defined as follows:

* Indicates that a quality control analyte recovery is outside of specified acceptance criteria.

** Indicates the analyte is a surrogate compound.

J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit or indicates that the analyte recovery in the MS or MSD is outside of specified acceptance criteria.

U Indicates the target analyte was analyzed for but not detected above the detection limit.

DL Indicates that sample is diluted.

RA Indicates that sample is re-analyzed without re-extraction.

RE Indicates that sample is re-extracted.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: Nik-Cole A. Elmore **Name: Nik-Cole Elmore**

Date: 05 DEC 2019 **Title: Analyst II**

Sample Data Summary

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 12:55**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267001**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**21.9**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SS01**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 14:31**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.14 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019156.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	0.934	ng/g	0.467	0.934	1.20
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.922	ng/g	0.461	0.922	1.20
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.658	ng/g	0.329	0.658	1.20
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.790	ng/g	0.395	0.790	1.20
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	U	0.395	ng/g	0.197	0.395	0.598
375-22-4	Perfluorobutyric acid (PFBA)		0.608	ng/g	0.239	0.479	0.598
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.395	ng/g	0.197	0.395	0.598
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.886	ng/g	0.443	0.886	1.20
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.395	ng/g	0.197	0.395	0.598
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	0.443	ng/g	0.221	0.443	0.598
375-85-9	Perfluoroheptanoic acid (PFHpA)	J	0.329	ng/g	0.197	0.395	0.598
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		2.22	ng/g	0.197	0.395	0.598
307-24-4	Perfluorohexanoic acid (PFHxA)		0.920	ng/g	0.239	0.479	0.598
375-95-1	Perfluorononanoic acid (PFNA)	U	0.395	ng/g	0.197	0.395	0.598
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.395	ng/g	0.197	0.395	0.598
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		8.94	ng/g	0.239	0.479	0.598
335-67-1	Perfluorooctanoic acid (PFOA)	J	0.597	ng/g	0.239	0.479	0.598
2706-90-3	Perfluoropentanoic acid (PFPeA)	J	0.478	ng/g	0.197	0.395	0.598
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.479	ng/g	0.239	0.479	0.598
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.395	ng/g	0.197	0.395	0.598
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.395	ng/g	0.197	0.395	0.598

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 13:00**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267002**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**19.8**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SB01 (2-3)**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 14:39**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.12 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019157.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	0.917	ng/g	0.459	0.917	1.18
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.906	ng/g	0.453	0.906	1.18
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.647	ng/g	0.323	0.647	1.18
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.776	ng/g	0.388	0.776	1.18
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	U	0.388	ng/g	0.194	0.388	0.588
375-22-4	Perfluorobutyric acid (PFBA)	U	0.470	ng/g	0.235	0.470	0.588
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.388	ng/g	0.194	0.388	0.588
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.870	ng/g	0.435	0.870	1.18
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.388	ng/g	0.194	0.388	0.588
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	0.435	ng/g	0.218	0.435	0.588
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	0.388	ng/g	0.194	0.388	0.588
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		0.755	ng/g	0.194	0.388	0.588
307-24-4	Perfluorohexanoic acid (PFHxA)	U	0.470	ng/g	0.235	0.470	0.588
375-95-1	Perfluorononanoic acid (PFNA)	U	0.388	ng/g	0.194	0.388	0.588
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.388	ng/g	0.194	0.388	0.588
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*	J	0.448	ng/g	0.235	0.470	0.588
335-67-1	Perfluorooctanoic acid (PFOA)	U	0.470	ng/g	0.235	0.470	0.588
2706-90-3	Perfluoropentanoic acid (PFPeA)	U	0.388	ng/g	0.194	0.388	0.588
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.470	ng/g	0.235	0.470	0.588
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.388	ng/g	0.194	0.388	0.588
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.388	ng/g	0.194	0.388	0.588

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 12:30**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267003**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**21.7**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SS02**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 14:48**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.44 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019158.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	0.817	ng/g	0.408	0.817	1.05
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.806	ng/g	0.403	0.806	1.05
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.576	ng/g	0.288	0.576	1.05
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.691	ng/g	0.346	0.691	1.05
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	U	0.346	ng/g	0.173	0.346	0.524
375-22-4	Perfluorobutyric acid (PFBA)	J	0.363	ng/g	0.209	0.419	0.524
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.346	ng/g	0.173	0.346	0.524
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.775	ng/g	0.387	0.775	1.05
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.346	ng/g	0.173	0.346	0.524
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	0.387	ng/g	0.194	0.387	0.524
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	0.346	ng/g	0.173	0.346	0.524
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		2.52	ng/g	0.173	0.346	0.524
307-24-4	Perfluorohexanoic acid (PFHxA)	J	0.505	ng/g	0.209	0.419	0.524
375-95-1	Perfluorononanoic acid (PFNA)	U	0.346	ng/g	0.173	0.346	0.524
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.346	ng/g	0.173	0.346	0.524
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		3.90	ng/g	0.209	0.419	0.524
335-67-1	Perfluorooctanoic acid (PFOA)	J	0.451	ng/g	0.209	0.419	0.524
2706-90-3	Perfluoropentanoic acid (PFPeA)	J	0.186	ng/g	0.173	0.346	0.524
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.419	ng/g	0.209	0.419	0.524
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.346	ng/g	0.173	0.346	0.524
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.346	ng/g	0.173	0.346	0.524

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 12:35**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267004**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**19.6**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SB02 (3-4)**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 14:56**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.04 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019159.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	0.951	ng/g	0.476	0.951	1.22
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.939	ng/g	0.469	0.939	1.22
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.671	ng/g	0.335	0.671	1.22
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.805	ng/g	0.402	0.805	1.22
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	U	0.402	ng/g	0.201	0.402	0.610
375-22-4	Perfluorobutyric acid (PFBA)	U	0.488	ng/g	0.244	0.488	0.610
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.402	ng/g	0.201	0.402	0.610
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.902	ng/g	0.451	0.902	1.22
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.402	ng/g	0.201	0.402	0.610
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	0.451	ng/g	0.226	0.451	0.610
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	0.402	ng/g	0.201	0.402	0.610
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*	J	0.391	ng/g	0.201	0.402	0.610
307-24-4	Perfluorohexanoic acid (PFHxA)	U	0.488	ng/g	0.244	0.488	0.610
375-95-1	Perfluorononanoic acid (PFNA)	U	0.402	ng/g	0.201	0.402	0.610
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.402	ng/g	0.201	0.402	0.610
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*	U	0.488	ng/g	0.244	0.488	0.610
335-67-1	Perfluorooctanoic acid (PFOA)	U	0.488	ng/g	0.244	0.488	0.610
2706-90-3	Perfluoropentanoic acid (PFPeA)	U	0.402	ng/g	0.201	0.402	0.610
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.488	ng/g	0.244	0.488	0.610
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.402	ng/g	0.201	0.402	0.610
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.402	ng/g	0.201	0.402	0.610

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 10:00**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267005**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**13**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SS03**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 15:05**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.03 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019160.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	0.883	ng/g	0.442	0.883	1.13
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.872	ng/g	0.436	0.872	1.13
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.623	ng/g	0.311	0.623	1.13
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.748	ng/g	0.374	0.748	1.13
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	U	0.374	ng/g	0.187	0.374	0.566
375-22-4	Perfluorobutyric acid (PFBA)		0.683	ng/g	0.227	0.453	0.566
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.374	ng/g	0.187	0.374	0.566
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.838	ng/g	0.419	0.838	1.13
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.374	ng/g	0.187	0.374	0.566
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	0.419	ng/g	0.210	0.419	0.566
375-85-9	Perfluoroheptanoic acid (PFHpA)	J	0.553	ng/g	0.187	0.374	0.566
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		2.81	ng/g	0.187	0.374	0.566
307-24-4	Perfluorohexanoic acid (PFHxA)		1.24	ng/g	0.227	0.453	0.566
375-95-1	Perfluorononanoic acid (PFNA)	U	0.374	ng/g	0.187	0.374	0.566
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.374	ng/g	0.187	0.374	0.566
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		9.16	ng/g	0.227	0.453	0.566
335-67-1	Perfluorooctanoic acid (PFOA)		0.744	ng/g	0.227	0.453	0.566
2706-90-3	Perfluoropentanoic acid (PFPeA)		1.19	ng/g	0.187	0.374	0.566
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.453	ng/g	0.227	0.453	0.566
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.374	ng/g	0.187	0.374	0.566
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.374	ng/g	0.187	0.374	0.566

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 10:05**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267006**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**12.7**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SB03 (3-4)**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 15:13**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.13 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019161.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	0.839	ng/g	0.419	0.839	1.08
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.828	ng/g	0.414	0.828	1.08
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.591	ng/g	0.296	0.591	1.08
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.710	ng/g	0.355	0.710	1.08
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	J	0.206	ng/g	0.177	0.355	0.538
375-22-4	Perfluorobutyric acid (PFBA)	J	0.505	ng/g	0.215	0.430	0.538
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.355	ng/g	0.177	0.355	0.538
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.796	ng/g	0.398	0.796	1.08
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.355	ng/g	0.177	0.355	0.538
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	J	0.235	ng/g	0.199	0.398	0.538
375-85-9	Perfluoroheptanoic acid (PFHpA)		0.578	ng/g	0.177	0.355	0.538
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		3.86	ng/g	0.177	0.355	0.538
307-24-4	Perfluorohexanoic acid (PFHxA)		1.41	ng/g	0.215	0.430	0.538
375-95-1	Perfluorononanoic acid (PFNA)	J	0.247	ng/g	0.177	0.355	0.538
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.355	ng/g	0.177	0.355	0.538
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		16.0	ng/g	0.215	0.430	0.538
335-67-1	Perfluorooctanoic acid (PFOA)		0.982	ng/g	0.215	0.430	0.538
2706-90-3	Perfluoropentanoic acid (PFPeA)		1.24	ng/g	0.177	0.355	0.538
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.430	ng/g	0.215	0.430	0.538
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.355	ng/g	0.177	0.355	0.538
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.355	ng/g	0.177	0.355	0.538

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 10:15**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267007**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**21.1**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SS04**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 15:22**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.4 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019162.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	0.824	ng/g	0.412	0.824	1.06
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.813	ng/g	0.407	0.813	1.06
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.581	ng/g	0.290	0.581	1.06
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.697	ng/g	0.349	0.697	1.06
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	U	0.349	ng/g	0.174	0.349	0.528
375-22-4	Perfluorobutyric acid (PFBA)	J	0.264	ng/g	0.211	0.422	0.528
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.349	ng/g	0.174	0.349	0.528
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.782	ng/g	0.391	0.782	1.06
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.349	ng/g	0.174	0.349	0.528
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	0.391	ng/g	0.195	0.391	0.528
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	0.349	ng/g	0.174	0.349	0.528
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*	J	0.314	ng/g	0.174	0.349	0.528
307-24-4	Perfluorohexanoic acid (PFHxA)	U	0.422	ng/g	0.211	0.422	0.528
375-95-1	Perfluorononanoic acid (PFNA)	U	0.349	ng/g	0.174	0.349	0.528
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.349	ng/g	0.174	0.349	0.528
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*	U	0.422	ng/g	0.211	0.422	0.528
335-67-1	Perfluorooctanoic acid (PFOA)	U	0.422	ng/g	0.211	0.422	0.528
2706-90-3	Perfluoropentanoic acid (PFPeA)	U	0.349	ng/g	0.174	0.349	0.528
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.422	ng/g	0.211	0.422	0.528
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.349	ng/g	0.174	0.349	0.528
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.349	ng/g	0.174	0.349	0.528

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 10:20**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267008**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**17.9**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SB04 (3-4)**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**12/03/2019 19:32**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.34 g**	**Final Volume:**	**10 mL**
Data File:	**PFC120219115.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	0.812	ng/g	0.406	0.812	1.04
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.802	ng/g	0.401	0.802	1.04
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.573	ng/g	0.286	0.573	1.04
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.687	ng/g	0.344	0.687	1.04
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	U	0.344	ng/g	0.172	0.344	0.521
375-22-4	Perfluorobutyric acid (PFBA)	J	0.246	ng/g	0.208	0.417	0.521
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.344	ng/g	0.172	0.344	0.521
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.771	ng/g	0.385	0.771	1.04
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.344	ng/g	0.172	0.344	0.521
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	0.385	ng/g	0.193	0.385	0.521
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	0.344	ng/g	0.172	0.344	0.521
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*	U	0.344	ng/g	0.172	0.344	0.521
307-24-4	Perfluorohexanoic acid (PFHxA)	U	0.417	ng/g	0.208	0.417	0.521
375-95-1	Perfluorononanoic acid (PFNA)	U	0.344	ng/g	0.172	0.344	0.521
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.344	ng/g	0.172	0.344	0.521
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*	U	0.417	ng/g	0.208	0.417	0.521
335-67-1	Perfluorooctanoic acid (PFOA)	U	0.417	ng/g	0.208	0.417	0.521
2706-90-3	Perfluoropentanoic acid (PFPeA)	U	0.344	ng/g	0.172	0.344	0.521
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.417	ng/g	0.208	0.417	0.521
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.344	ng/g	0.172	0.344	0.521
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.344	ng/g	0.172	0.344	0.521

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 12:00**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267009**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**14.4**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SS05**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 15:48**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.25 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019165.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)		1.27	ng/g	0.405	0.810	1.04
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.799	ng/g	0.400	0.799	1.04
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.571	ng/g	0.285	0.571	1.04
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.685	ng/g	0.343	0.685	1.04
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*		0.530	ng/g	0.171	0.343	0.519
375-22-4	Perfluorobutyric acid (PFBA)		0.694	ng/g	0.208	0.415	0.519
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.343	ng/g	0.171	0.343	0.519
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.768	ng/g	0.384	0.768	1.04
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.343	ng/g	0.171	0.343	0.519
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	J	0.383	ng/g	0.192	0.384	0.519
375-85-9	Perfluoroheptanoic acid (PFHpA)		0.760	ng/g	0.171	0.343	0.519
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		8.88	ng/g	0.171	0.343	0.519
307-24-4	Perfluorohexanoic acid (PFHxA)		2.41	ng/g	0.208	0.415	0.519
375-95-1	Perfluorononanoic acid (PFNA)	J	0.310	ng/g	0.171	0.343	0.519
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.343	ng/g	0.171	0.343	0.519
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		26.6	ng/g	0.208	0.415	0.519
335-67-1	Perfluorooctanoic acid (PFOA)		1.09	ng/g	0.208	0.415	0.519
2706-90-3	Perfluoropentanoic acid (PFPeA)		2.87	ng/g	0.171	0.343	0.519
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.415	ng/g	0.208	0.415	0.519
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.343	ng/g	0.171	0.343	0.519
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.343	ng/g	0.171	0.343	0.519

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 12:05**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267010**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**25**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SB05 (2-3)**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 15:56**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.35 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019166.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	0.885	ng/g	0.442	0.885	1.13
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.873	ng/g	0.437	0.873	1.13
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.624	ng/g	0.312	0.624	1.13
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.749	ng/g	0.374	0.749	1.13
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	J	0.535	ng/g	0.187	0.374	0.567
375-22-4	Perfluorobutyric acid (PFBA)		1.14	ng/g	0.227	0.454	0.567
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.374	ng/g	0.187	0.374	0.567
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.839	ng/g	0.420	0.839	1.13
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.374	ng/g	0.187	0.374	0.567
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*		0.697	ng/g	0.210	0.420	0.567
375-85-9	Perfluoroheptanoic acid (PFHpA)		0.838	ng/g	0.187	0.374	0.567
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		11.4	ng/g	0.187	0.374	0.567
307-24-4	Perfluorohexanoic acid (PFHxA)		2.52	ng/g	0.227	0.454	0.567
375-95-1	Perfluorononanoic acid (PFNA)	J	0.482	ng/g	0.187	0.374	0.567
754-91-6	Perfluorooctanesulfonamide (PFOSA)	J	0.218	ng/g	0.187	0.374	0.567
335-67-1	Perfluorooctanoic acid (PFOA)		2.86	ng/g	0.227	0.454	0.567
2706-90-3	Perfluoropentanoic acid (PFPeA)		1.82	ng/g	0.187	0.374	0.567
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.454	ng/g	0.227	0.454	0.567
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.374	ng/g	0.187	0.374	0.567
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.374	ng/g	0.187	0.374	0.567

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 12:05**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267010**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**25**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SB05 (2-3)DL**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**5**
Run Date:	**11/27/2019 15:01**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.35 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019231.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		61.3	ng/g	1.13	2.27	2.84

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 10:45**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267011**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**19.5**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SS06**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 16:05**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.39 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019167.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	0.811	ng/g	0.405	0.811	1.04
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.801	ng/g	0.400	0.801	1.04
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.572	ng/g	0.286	0.572	1.04
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.686	ng/g	0.343	0.686	1.04
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*		1.03	ng/g	0.172	0.343	0.520
375-22-4	Perfluorobutyric acid (PFBA)	J	0.359	ng/g	0.208	0.416	0.520
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.343	ng/g	0.172	0.343	0.520
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.769	ng/g	0.385	0.769	1.04
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.343	ng/g	0.172	0.343	0.520
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	0.385	ng/g	0.192	0.385	0.520
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	0.343	ng/g	0.172	0.343	0.520
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		8.73	ng/g	0.172	0.343	0.520
307-24-4	Perfluorohexanoic acid (PFHxA)	J	0.299	ng/g	0.208	0.416	0.520
375-95-1	Perfluorononanoic acid (PFNA)	U	0.343	ng/g	0.172	0.343	0.520
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.343	ng/g	0.172	0.343	0.520
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		3.02	ng/g	0.208	0.416	0.520
335-67-1	Perfluorooctanoic acid (PFOA)	U	0.416	ng/g	0.208	0.416	0.520
2706-90-3	Perfluoropentanoic acid (PFPeA)	J	0.226	ng/g	0.172	0.343	0.520
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.416	ng/g	0.208	0.416	0.520
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.343	ng/g	0.172	0.343	0.520
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.343	ng/g	0.172	0.343	0.520

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 10:50**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267012**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**19.9**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SB06 (3-4)**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 16:30**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.34 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019170.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	0.832	ng/g	0.416	0.832	1.07
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.822	ng/g	0.411	0.822	1.07
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.587	ng/g	0.293	0.587	1.07
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.704	ng/g	0.352	0.704	1.07
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*		1.53	ng/g	0.176	0.352	0.533
375-22-4	Perfluorobutyric acid (PFBA)	U	0.427	ng/g	0.213	0.427	0.533
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.352	ng/g	0.176	0.352	0.533
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.789	ng/g	0.395	0.789	1.07
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.352	ng/g	0.176	0.352	0.533
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	0.395	ng/g	0.197	0.395	0.533
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	0.352	ng/g	0.176	0.352	0.533
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		2.70	ng/g	0.176	0.352	0.533
307-24-4	Perfluorohexanoic acid (PFHxA)	U	0.427	ng/g	0.213	0.427	0.533
375-95-1	Perfluorononanoic acid (PFNA)	U	0.352	ng/g	0.176	0.352	0.533
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.352	ng/g	0.176	0.352	0.533
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*	J	0.387	ng/g	0.213	0.427	0.533
335-67-1	Perfluorooctanoic acid (PFOA)	U	0.427	ng/g	0.213	0.427	0.533
2706-90-3	Perfluoropentanoic acid (PFPeA)	U	0.352	ng/g	0.176	0.352	0.533
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.427	ng/g	0.213	0.427	0.533
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.352	ng/g	0.176	0.352	0.533
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.352	ng/g	0.176	0.352	0.533

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 11:30**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267013**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**19.4**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SS07DL**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**50**
Run Date:	**11/22/2019 16:39**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.31 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019171.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		938	ng/g	10.7	21.5	26.9

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 11:30**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267013**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**19.4**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SS07**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 18:13**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.31 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019182.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	J	0.838	ng/g	0.419	0.838	1.07
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.827	ng/g	0.414	0.827	1.07
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.591	ng/g	0.295	0.591	1.07
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.709	ng/g	0.355	0.709	1.07
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*		3.08	ng/g	0.177	0.355	0.537
375-22-4	Perfluorobutyric acid (PFBA)		2.70	ng/g	0.215	0.430	0.537
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*		3.18	ng/g	0.177	0.355	0.537
335-76-2	Perfluorodecanoic acid (PFDA)		3.03	ng/g	0.398	0.795	1.07
307-55-1	Perfluorododecanoic acid (PFDoA)		0.608	ng/g	0.177	0.355	0.537
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*		11.0	ng/g	0.199	0.398	0.537
375-85-9	Perfluoroheptanoic acid (PFHpA)		4.99	ng/g	0.177	0.355	0.537
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		51.4	ng/g	0.177	0.355	0.537
307-24-4	Perfluorohexanoic acid (PFHxA)		8.25	ng/g	0.215	0.430	0.537
375-95-1	Perfluorononanoic acid (PFNA)		3.52	ng/g	0.177	0.355	0.537
754-91-6	Perfluorooctanesulfonamide (PFOSA)		1.46	ng/g	0.177	0.355	0.537
335-67-1	Perfluorooctanoic acid (PFOA)		6.18	ng/g	0.215	0.430	0.537
2706-90-3	Perfluoropentanoic acid (PFPeA)		11.6	ng/g	0.177	0.355	0.537
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	J	0.221	ng/g	0.215	0.430	0.537
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	J	0.215	ng/g	0.177	0.355	0.537
2058-94-8	Perfluoroundecanoic acid (PFUdA)		1.54	ng/g	0.177	0.355	0.537

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 11:35**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267014**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**19.2**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SB07 (2-3)**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 17:47**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.47 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019179.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	0.782	ng/g	0.391	0.782	1.00
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.772	ng/g	0.386	0.772	1.00
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.552	ng/g	0.276	0.552	1.00
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.662	ng/g	0.331	0.662	1.00
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*		1.90	ng/g	0.165	0.331	0.501
375-22-4	Perfluorobutyric acid (PFBA)		0.775	ng/g	0.201	0.401	0.501
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.331	ng/g	0.165	0.331	0.501
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.742	ng/g	0.371	0.742	1.00
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.331	ng/g	0.165	0.331	0.501
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	J	0.286	ng/g	0.186	0.371	0.501
375-85-9	Perfluoroheptanoic acid (PFHpA)	J	0.359	ng/g	0.165	0.331	0.501
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		8.41	ng/g	0.165	0.331	0.501
307-24-4	Perfluorohexanoic acid (PFHxA)		2.69	ng/g	0.201	0.401	0.501
375-95-1	Perfluorononanoic acid (PFNA)	U	0.331	ng/g	0.165	0.331	0.501
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.331	ng/g	0.165	0.331	0.501
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		8.44	ng/g	0.201	0.401	0.501
335-67-1	Perfluorooctanoic acid (PFOA)		0.506	ng/g	0.201	0.401	0.501
2706-90-3	Perfluoropentanoic acid (PFPeA)		1.86	ng/g	0.165	0.331	0.501
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.401	ng/g	0.201	0.401	0.501
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.331	ng/g	0.165	0.331	0.501
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.331	ng/g	0.165	0.331	0.501

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 11:05**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267015**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**19.7**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SS08**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 17:04**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.08 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019174.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	0.933	ng/g	0.467	0.933	1.20
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.922	ng/g	0.461	0.922	1.20
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.658	ng/g	0.329	0.658	1.20
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.790	ng/g	0.395	0.790	1.20
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	U	0.395	ng/g	0.197	0.395	0.598
375-22-4	Perfluorobutyric acid (PFBA)	J	0.409	ng/g	0.239	0.479	0.598
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.395	ng/g	0.197	0.395	0.598
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.886	ng/g	0.443	0.886	1.20
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.395	ng/g	0.197	0.395	0.598
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	0.443	ng/g	0.221	0.443	0.598
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	0.395	ng/g	0.197	0.395	0.598
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		2.35	ng/g	0.197	0.395	0.598
307-24-4	Perfluorohexanoic acid (PFHxA)	J	0.329	ng/g	0.239	0.479	0.598
375-95-1	Perfluorononanoic acid (PFNA)	U	0.395	ng/g	0.197	0.395	0.598
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.395	ng/g	0.197	0.395	0.598
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		2.11	ng/g	0.239	0.479	0.598
335-67-1	Perfluorooctanoic acid (PFOA)	U	0.479	ng/g	0.239	0.479	0.598
2706-90-3	Perfluoropentanoic acid (PFPeA)	J	0.199	ng/g	0.197	0.395	0.598
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.479	ng/g	0.239	0.479	0.598
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.395	ng/g	0.197	0.395	0.598
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.395	ng/g	0.197	0.395	0.598

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 11:10**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267016**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**20.8**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SB08 (3-4)**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 17:13**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.09 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019175.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	0.942	ng/g	0.471	0.942	1.21
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.930	ng/g	0.465	0.930	1.21
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.664	ng/g	0.332	0.664	1.21
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.797	ng/g	0.399	0.797	1.21
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	J	0.363	ng/g	0.199	0.399	0.604
375-22-4	Perfluorobutyric acid (PFBA)	J	0.379	ng/g	0.242	0.483	0.604
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.399	ng/g	0.199	0.399	0.604
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.894	ng/g	0.447	0.894	1.21
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.399	ng/g	0.199	0.399	0.604
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	0.447	ng/g	0.223	0.447	0.604
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	0.399	ng/g	0.199	0.399	0.604
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		1.79	ng/g	0.199	0.399	0.604
307-24-4	Perfluorohexanoic acid (PFHxA)	J	0.387	ng/g	0.242	0.483	0.604
375-95-1	Perfluorononanoic acid (PFNA)	U	0.399	ng/g	0.199	0.399	0.604
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.399	ng/g	0.199	0.399	0.604
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		1.60	ng/g	0.242	0.483	0.604
335-67-1	Perfluorooctanoic acid (PFOA)	U	0.483	ng/g	0.242	0.483	0.604
2706-90-3	Perfluoropentanoic acid (PFPeA)	J	0.332	ng/g	0.199	0.399	0.604
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.483	ng/g	0.242	0.483	0.604
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.399	ng/g	0.199	0.399	0.604
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.399	ng/g	0.199	0.399	0.604

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 15:10**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267017**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**17.6**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SS09DL**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**10**
Run Date:	**11/22/2019 17:22**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.08 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019176.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		147	ng/g	2.33	4.66	5.83

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 15:10**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267017**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**17.6**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SS09**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 17:56**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.08 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019180.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	0.910	ng/g	0.455	0.910	1.17
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.898	ng/g	0.449	0.898	1.17
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.641	ng/g	0.321	0.641	1.17
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.770	ng/g	0.385	0.770	1.17
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*		1.18	ng/g	0.192	0.385	0.583
375-22-4	Perfluorobutyric acid (PFBA)		1.07	ng/g	0.233	0.466	0.583
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.385	ng/g	0.192	0.385	0.583
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.863	ng/g	0.432	0.863	1.17
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.385	ng/g	0.192	0.385	0.583
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*		2.24	ng/g	0.216	0.432	0.583
375-85-9	Perfluoroheptanoic acid (PFHpA)		3.79	ng/g	0.192	0.385	0.583
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		25.4	ng/g	0.192	0.385	0.583
307-24-4	Perfluorohexanoic acid (PFHxA)		3.34	ng/g	0.233	0.466	0.583
375-95-1	Perfluorononanoic acid (PFNA)		6.24	ng/g	0.192	0.385	0.583
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.385	ng/g	0.192	0.385	0.583
335-67-1	Perfluorooctanoic acid (PFOA)		11.0	ng/g	0.233	0.466	0.583
2706-90-3	Perfluoropentanoic acid (PFPeA)		2.84	ng/g	0.192	0.385	0.583
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.466	ng/g	0.233	0.466	0.583
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.385	ng/g	0.192	0.385	0.583
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.385	ng/g	0.192	0.385	0.583

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 15:15**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267018**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**23.2**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SB09 (3-4)DL**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**10**
Run Date:	**11/22/2019 17:30**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.39 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019177.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		50.1	ng/g	1.80	3.60	5.45
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		147	ng/g	2.18	4.36	5.45

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 15:15**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267018**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**23.2**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SB09 (3-4)**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 18:04**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.39 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019181.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	0.850	ng/g	0.425	0.850	1.09
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.839	ng/g	0.420	0.839	1.09
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.600	ng/g	0.300	0.600	1.09
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.720	ng/g	0.360	0.720	1.09
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*		2.84	ng/g	0.180	0.360	0.545
375-22-4	Perfluorobutyric acid (PFBA)		1.86	ng/g	0.218	0.436	0.545
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.360	ng/g	0.180	0.360	0.545
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.807	ng/g	0.403	0.807	1.09
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.360	ng/g	0.180	0.360	0.545
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*		5.47	ng/g	0.202	0.403	0.545
375-85-9	Perfluoroheptanoic acid (PFHpA)		5.51	ng/g	0.180	0.360	0.545
307-24-4	Perfluorohexanoic acid (PFHxA)		12.2	ng/g	0.218	0.436	0.545
375-95-1	Perfluorononanoic acid (PFNA)		2.15	ng/g	0.180	0.360	0.545
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.360	ng/g	0.180	0.360	0.545
335-67-1	Perfluorooctanoic acid (PFOA)		20.5	ng/g	0.218	0.436	0.545
2706-90-3	Perfluoropentanoic acid (PFPeA)		5.78	ng/g	0.180	0.360	0.545
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.436	ng/g	0.218	0.436	0.545
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.360	ng/g	0.180	0.360	0.545
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.360	ng/g	0.180	0.360	0.545

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496267**	**Date Collected:**	**11/12/2019 14:00**	**Matrix:**	**SOIL**
Lab Sample ID:	**496267019**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**19.3**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SB10 (3-4)**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1939152**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 17:39**	**Analyst:**	**JLS**		
Prep Date:	**11/19/2019 09:09**	**Aliquot:**	**2.13 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019178.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	0.908	ng/g	0.454	0.908	1.16
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.896	ng/g	0.448	0.896	1.16
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.640	ng/g	0.320	0.640	1.16
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.768	ng/g	0.384	0.768	1.16
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	J	0.511	ng/g	0.192	0.384	0.582
375-22-4	Perfluorobutyric acid (PFBA)	J	0.526	ng/g	0.233	0.466	0.582
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.384	ng/g	0.192	0.384	0.582
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.861	ng/g	0.431	0.861	1.16
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.384	ng/g	0.192	0.384	0.582
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	J	0.349	ng/g	0.215	0.431	0.582
375-85-9	Perfluoroheptanoic acid (PFHpA)	J	0.479	ng/g	0.192	0.384	0.582
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		17.8	ng/g	0.192	0.384	0.582
307-24-4	Perfluorohexanoic acid (PFHxA)		2.65	ng/g	0.233	0.466	0.582
375-95-1	Perfluorononanoic acid (PFNA)	U	0.384	ng/g	0.192	0.384	0.582
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.384	ng/g	0.192	0.384	0.582
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		7.78	ng/g	0.233	0.466	0.582
335-67-1	Perfluorooctanoic acid (PFOA)		0.956	ng/g	0.233	0.466	0.582
2706-90-3	Perfluoropentanoic acid (PFPeA)		0.769	ng/g	0.192	0.384	0.582
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.466	ng/g	0.233	0.466	0.582
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.384	ng/g	0.192	0.384	0.582
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.384	ng/g	0.192	0.384	0.582

Packing Slip:

EA Engineering, Science, and Technology, Inc., PBC
NFARS West End Electrical
SDG: 496272
Attn:Lindsay Mairs

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DODQSM Cover Sheet

DOD-QSM Cover Sheet

NFARS West End Electrical

December 05, 2019

GEL Laboratories, LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Project Manager: Julie Robinson
Phone Extension: 4289
Email: Julie.Robinson@gel.com

Contract Purchase Order: 19623

Work Order: 496272 **SDG:** 496272

Client Contact:
Lindsay Mairs
EA Engineering, Science, and Technology, Inc., PBC
269 W. Jefferson Street
Syracuse, New York 13202

Project Identification: NFARS West End Electrical

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

GEL appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on November 14, 2019. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures. If you have any questions, please do not hesitate to contact me at the phone number or e-mail address listed above.

Sincerely,

Julie Robinson
Project Manager

Case Narrative

DODQSM Case Narrative
for
EA Engineering, Science, and Technology, Inc., PBC
SDG: 496272

December 05, 2019

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary

Sample Receipt The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on November 14, 2019 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

Laboratory ID	Client ID
496272001	NFARS-FTA-2019-SS10
496272002	NFARS-FTA-2019-SS11
496272003	NFARS-FTA-2019-SB11 (2-3)
496272004	NFARS-FTA-2019-SS12
496272005	NFARS-FTA-2019-SB12 (3-4)
496272006	NFARS-FTA-2019-SS13
496272007	NFARS-FTA-2019-SB13 (2-3)
496272008	NFARS-FTA-2019-SS14
496272009	NFARS-FTA-2019-SB14 (2-4)
496272010	NFARS-FTA-2019-SS15
496272011	NFARS-FTA-2019-SB15 (2-3)
496272012	NFARS-FTA-2019-SS16
496272013	NFARS-FTA-2019-SB16 (3-4)
496272014	NFARS-FTA-2019-SS17
496272015	NFARS-FTA-2019-SB17 (3-4)
496272016	NFARS-FTA-2019-S-FD01
496272017	NFARS-FTA-2019-S-FD02
496272018	NFARS-FTA-2019-S-FD03
496272019	NFARS-FTA-2019-S-FD04

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: LCMSMS-Misc.

Julie Robinson
Project Manager

Chain of Custody and Supporting Documentation

Cooler 1 of 2

Page: 1 of 5
Project # Leo Daly
GEL Quote #: EA(RVKA19-0734)
COC Number [1]: —
PO Number: 19623

496267
496272
496277

GEL Laboratories LLC
Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics
gel.com

Chain of Custody and Analytical Request

GEL Work Order Number:

GEL Project Manager:

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: EA Engineering
Phone # 716-243-6227
Project/Site Name: NFARS West End Project
Fax # —
Address: Lockport Rd Niagara Falls, NY
Collected By: Lindsay Mairs
Send Results To: lmairs@eaest.com

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date/time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Should this sample be considered: Radioactive (Please supply isotopic info.)	Should this sample be considered: (7) Known or possible hazards	Total number of containers	Full Parts	Target Analyte List PFAS											<-- Preservative Type (6)
NFARS-FTA-2019-SS01	11/12/19	1255			Soil	No	No	1	X												
NFARS-FTA-2019-SB01 (2-3)		1300						1													
NFARS-FTA-2019-SS02		1230						1													
NFARS-FTA-2019-SB02 (3-4)		1235						1													
NFARS-FTA-2019-SS03		1000						1													
NFARS-FTA-2019-SB03 (3-4)		1005						1													
NFARS-FTA-2019-SS04		1015						1													
NFARS-FTA-2019-SB04 (3-4)		1020						1													
NFARS-FTA-2019-SS05		1200						1													
NFARS-FTA-2019-SB05 (2-3)	11/12/19	1205			Soil	No	No	1	X												
~~NFARS-FTA-2019~~																					

Comments
Note: extra sample is required for sample specific QC

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1 Lindsay Mairs	11/13/19	1830	1 [illegible]	11/14/19	9:10
2			2		
3			3		

TAT Requested: Normal: X Rush: ____ Specify: ____ (Subject to Surcharge)

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4

Additional Remarks: ERPIMS NYDEC EDD CAT B

For Lab Receiving Use Only: *Custody Seal Intact?* [ ] *Yes* [ ] *No* ***Cooler Temp:*** ____ °C

> ***For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)***

Sample Collection Time Zone: [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other: ____

1.) Chain of Custody Number = Client Determined

2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite

3.) Field Filtered: For liquid matrices, indicate with a - **Y** - for yes the sample was field filtered or - **N** - for sample was not field filtered.

4.) Matrix Codes: **DW**=Drinking Water, **GW**=Groundwater, **SW**=Surface Water, **WW**=Waste Water, **W**=Water, **ML**=Misc Liquid, **SO**=Soil, **SD**=Sediment, **SL**=Sludge, **SS**=Solid Waste, **O**=Oil, **F**=Filter, **P**=Wipe, **U**=Urine, **F**=Fecal, **N**=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B, 6010B/7470A**) and number of containers provided for each (i.e. *8260B* - **3**, *6010B 7470A* - **1**).

6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) *Are there any known or possible hazards associated with these samples?*

RCRA Metals
As = Arsenic **Hg**= Mercury
Ba = Barium **Se**= Selenium
Cd = Cadmium **Ag**= Silver
Cr = Chromium **MR**= Miscellaneous RCRA metals
Pb = Lead

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. *(i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)*

ME Chain of Custody
2 no coolers

Page: 2 of 5
Project #: Leo Daly
GEL Quote #: EA (PRVKQ19-0034)
COC Number (1): —
PO Number: 19623

GEL Laboratories LLC
gel.com
Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

GEL Work Order Number:
GEL Project Manager:

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: EA
Phone # 716-248-6227
Project/Site Name: NFARS Western
Fax #
Address: Sanul
Collected By: LM
Send Results To: lmars@eaest.com

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Should this sample be considered: Radioactive (Please supply isotopic info.)	Should this sample be considered: (7) Known or possible hazards	Total number of containers	Full PFAS Target Analyte List + EPA 537	<-- Preservative Type (6)	Comments
NFARS-FTA-2019-SS06	11/12/19	1045	MS/MSD		Soil	No	No	3	X		Note: extra sample is required for sample specific QC
NFARS-FTA-2019-SB06 (3-4)		1050						1			
NFARS-FTA-2019-SS07		1130						1			
NFARS-FTA-2019-SB07 (2-3)		1135						1			
NFARS-FTA-2019-SS08		1105						1			
NFARS-FTA-2019-SB08 (3-4)		1110						1			
NFARS-FTA-2019-SS09		1510						1			
NFARS-FTA-2019-SB09 (3-4)		1515						1			
NFARS-FTA-2019-SS10		1350	MS/MSD					3			
NFARS-FTA-2019-SB10 (3-4)	11/12/19	1400			Soil	No	No	1	X		

~~NFARS-FTA-2019~~

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1	11/13/19	1800	1 A. Mann	11/14/19	9:10
2			2		
3			3		

TAT Requested: Normal: X Rush: ____ Specify: ____ (Subject to Surcharge)

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4

Additional Remarks: EFARS NYSDEC EDD CAT B

For Lab Receiving Use Only: *Custody Seal Intact?* [ ] Yes [ ] No **Cooler Temp:** ____ °C

> ***For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)***

Sample Collection Time Zone: [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other: ____

1.) Chain of Custody Number = Client Determined

2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite

3.) Field Filtered: For liquid matrices, indicate with a **- Y -** for yes the sample was field filtered or **- N -** for sample was not field filtered.

4.) Matrix Codes: **DW**=Drinking Water, **GW**=Groundwater, **SW**=Surface Water, **WW**=Waste Water, **W**=Water, **ML**=Misc Liquid, **SO**=Soil, **SD**=Sediment, **SL**=Sludge, **SS**=Solid Waste, **O**=Oil, **F**=Filter, **P**=Wipe, **U**=Urine, **F**=Fecal, **N**=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B, 6010B/7470A**) and number of containers provided for each (i.e. *8260B* - **3**, *6010B 7470A* - **1**).

6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) *Are there any known or possible hazards associated with these samples?*

RCRA Metals
As = Arsenic **Hg**= Mercury
Ba = Barium **Se**= Selenium
Cd = Cadmium **Ag**= Silver
Cr = Chromium **MR**= Miscellaneous
Pb = Lead RCRA metals

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. *(i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)*

Page: 3 of 5
Project # Lea Daly
GEL Quote #: Some
COC Number (1): —
PO Number: 196023

GEL Laboratories LLC
gel.com
Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

GEL Work Order Number: GEL Project Manager:

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: EA Phone # 716-243-6227
Project/Site Name: NFARS Fax # —
Address: Some
Collected By: LM Send Results To: lmarsaccast

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Should this sample be considered: Radioactive (Please supply isotopic info.)	Should this sample be considered: (7) Known or possible hazards	Total number of containers	GULFLINK	Target Analyte 1,4 DIOXANE	<-- Preservative Type (6)	Comments
NFARS-FTA-2019-SS11	11/12/19	1420			Soil	No	No	1	X			Note: extra sample is required for sample specific QC
NFARS-FTA-2019-SB11 (2-3)		1425						1				
NFARS-FTA-2019-SS12		1440						1				
NFARS-FTA-2019-SB12 (3-4)		1445						1				
NFARS-FTA-2019-SS13		1500						1				
NFARS-FTA-2019-SB13 (2-3)	11/12/19	1505						1				
NFARS-FTA-2019-SS14	11/13/19	0935						1				
NFARS-FTA-2019-SB14 (2-4)	11/13/19	0940						1				
NFARS-FTA-2019-SS15	11/13/19	1010						1				
NFARS-FTA-2019-SB15 (2-3)	11/13/19	1015			Soil	No	No	1	X			

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1	11/13/19	1000	1	11/14/19	9:10
2			2		
3			3		

TAT Requested: Normal: X Rush: ____ Specify: ____ (Subject to Surcharge)

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4

Additional Remarks: EQUIS NYSDEC EDD CAT B

For Lab Receiving Use Only: *Custody Seal Intact?* [ ] *Yes* [ ] *No* ***Cooler Temp:*** ____ °C

> ***For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)***

Sample Collection Time Zone: [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other: ____

1.) Chain of Custody Number = Client Determined

2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite

3.) Field Filtered: For liquid matrices, indicate with a **- Y -** for yes the sample was field filtered or **- N -** for sample was not field filtered.

4.) Matrix Codes: **DW**=Drinking Water, **GW**=Groundwater, **SW**=Surface Water, **WW**=Waste Water, **W**=Water, **ML**=Misc Liquid, **SO**=Soil, **SD**=Sediment, **SL**=Sludge, **SS**=Solid Waste, **O**=Oil, **F**=Filter, **P**=Wipe, **U**=Urine, **F**=Fecal, **N**=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B, 6010B/7470A**) and number of containers provided for each (i.e. *8260B* **- 3**, *6010B 7470A* **- 1**).

6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) *Are there any known or possible hazards associated with these samples?*

RCRA Metals
As = Arsenic **Hg**= Mercury
Ba = Barium **Se**= Selenium
Cd = Cadmium **Ag**= Silver
Cr = Chromium **MR**= Miscellaneous
Pb = Lead RCRA metals

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. *(i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)*

SEE CHAIN OF CUSTODY FOR 1,4 DIOXANE

Page: 4 of 5 Project # GEL Quote #: [illegible] COC Number [1]: PO Number: 19623	**GEL** Laboratories LLC gel.com Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics **Chain of Custody and Analytical Request** *GEL Work Order Number:* *GEL Project Manager:*	GEL Laboratories, LLC 2040 Savage Road Charleston, SC 29407 Phone: (843) 556-8171 Fax: (843) 766-1178

Client Name: EA — Phone # 716-2436227

Project/Site Name: NFARS West End — Fax # —

Address: Same

Collected By: LM — Send Results To: lmairs@eaest.com

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Sample ID * For composites - indicate start and stop date time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Should this sample be considered: Radioactive (Please supply isotopic info.)	(7) Known or possible hazards	Total number of containers	[illegible] Full	Target Analyte	1st EPA 537	Comments Note: extra sample is required for sample specific QC
<-- Preservative Type (6)												
NFARS-FTA-2019-SS16	11/13/19	1100			SOIL	No	No	1	X			
NFARS-FTA-2019-SB16 (3-4)	11/13/19	1105						1				
NFARS-FTA-2019-SS17	11/13/19	1035						1				
NFARS-FTA-2019-SB17 (3-4)	11/13/19	1040						1				
NFARS-FTA-2019-S-FD01	11/12/19	—	FD					1				
NFARS-FTA-2019-S-FD02	11/12/19	—	FD					1				
NFARS-FTA-2019-S-FD03	11/12/19	—	FD					1				
NFARS-FTA-2019-S-FD04	11/13/19	—	FD		SOIL			1				
NFARS-FTA-2019-EB-01	11/12/19	1520	EB		W			2				Equipment Blank
NFARS-FTA-2019-EB-02	11/12/19	1525	EB		W	No	No	2	X			Equipment Blank

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1 [signature]	11/13/19	1830	1 [signature]	11/14/19	9:10
2			2		
3			3		

TAT Requested: Normal: X Rush: ____ Specify: ____ **(Subject to Surcharge)**

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4

Additional Remarks: ERPIMS, NYSDEC EDD CAT B [illegible]

For Lab Receiving Use Only: *Custody Seal Intact?* [ ] Yes [ ] No ***Cooler Temp:*** ____ °C

> For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)

Sample Collection Time Zone: [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other: ____

1.) Chain of Custody Number = Client Determined

2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite

3.) Field Filtered: For liquid matrices, indicate with a - **Y** - for yes the sample was field filtered or - **N** - for sample was not field filtered.

4.) Matrix Codes: **DW**=Drinking Water, **GW**=Groundwater, **SW**=Surface Water, **WW**=Waste Water, **W**=Water, **ML**=Misc Liquid, **SO**=Soil, **SD**=Sediment, **SL**=Sludge, **SS**=Solid Waste, **O**=Oil, **F**=Filter, **P**=Wipe, **U**=Urine, **F**=Fecal, **N**=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B, 6010B/7470A**) and number of containers provided for each (i.e. *8260B* - **3**, *6010B 7470A* - **1**).

6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) *Are there any known or possible hazards associated with these samples?*

RCRA Metals	Characteristic Hazards	Listed Waste	Other	Please provide any additional details below regarding handling and/or disposal concerns.
As = Arsenic, **Hg** = Mercury **Ba** = Barium, **Se** = Selenium **Cd** = Cadmium, **Ag** = Silver **Cr** = Chromium, **MR** = Miscellaneous RCRA metals **Pb** = Lead	**FL** = Flammable/Ignitable **CO** = Corrosive **RE** = Reactive **TSCA Regulated** **PCB** = Polychlorinated biphenyls	**LW** = Listed Waste *(F,K,P and U-listed wastes.)* ***Waste code(s):***	**OT** = Other / Unknown *(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)* ***Description:***	*(i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)*

Page: 5 of 5
Project # Leo Daly
GEL Quote #: SAME
COC Number (1):
PO Number: 19623

GEL Laboratories LLC
gel.com | Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

GEL Work Order Number: GEL Project Manager:

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: EA Phone # 716-243-6225
Project/Site Name: NFARS West End Fax #
Address: Same
Collected By: LM Send Results To: lmaas@peaest.com

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date/time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Should this sample be considered: Radioactive (Please supply isotopic info.)	Should this sample be considered: (7) Known or possible hazards	Total number of containers	EPA 6010 Full Inorganics List	EPA 537	<-- Preservative Type (6)	Comments
NFARS-FTA-2019-EB-03	11/13/19	1135	EB		W	No	No	2	X			Equipment Blank
NFARS-FTA-2019-EB-04	11/13/19	1140	EB		W			2				Equipment Blank
NFARS-FTA-2019TB-01	11/12/19	0800	TB		W			2				Trip Blank
NFARS-FTA-2019TB-02	11/13/19	0800	TB		W			2				Trip Blank
NFARS-FTA-2019FB-01	11/12/19	0945	FB		W			2				Field Blank
NFARS-FTA-2019FB-02	11/13/19	0920	FB		W	No	No	2	X			Field Blank

Chain of Custody Signatures

	Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1	[signature]	11/13/19	1830	A. Allen	11/14/19	9:10
2						
3						

TAT Requested: Normal: ____ Rush: ____ Specify: ____ (Subject to Surcharge)

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4

Additional Remarks:

For Lab Receiving Use Only: *Custody Seal Intact?* [ ] *Yes* [ ] *No* ***Cooler Temp:*** ____ °C

> ***For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)***

Sample Collection Time Zone: [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other: ____

1.) Chain of Custody Number = Client Determined

2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite

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5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B**, **6010B/7470A**) and number of containers provided for each (i.e. *8260B* **- 3**, *6010B 7470A* **- 1**).

6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) *Are there any known or possible hazards associated with these samples?*

RCRA Metals
As = Arsenic **Hg**= Mercury
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Cd = Cadmium **Ag**= Silver
Cr = Chromium **MR**= Miscellaneous
Pb = Lead RCRA metals

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. *(i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)*

496 267
496 272
496 277

GEL Laboratories LLC

JF

SAMPLE RECEIPT & REVIEW FORM

Client: ESAT	**SDG/AR/COC/Work Order:**
Received By: AJA	**Date Received:** 11/14/19
Carrier and Tracking Number	Circle Applicable: (FedEx Express) FedEx Ground UPS Field Services Courier Other 7780 1186 4257 (2 coolers)

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#: If UN2910, Is the Radioactive Shipment Survey Compliant? Yes___ No___
B) Did the client designate the samples are to be received as radioactive?		✓	COC notation or radioactive stickers on containers equal client designation.
C) Did the RSO classify the samples as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3
D) Did the client designate samples are hazardous?		✓	COC notation or hazard labels on containers equal client designation.
E) Did the RSO identify possible hazards?		✓	If D or E is yes, select Hazards below. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	✓			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	✓			Preservation Method: (Wet Ice) Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP: 1°
4	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: IR4-16 Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?			✓	Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?			✓	If Yes, are Encores or Soil Kits present for solids? Yes___ No___ NA___(If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes___ No___ NA___(If unknown, select No) Are liquid VOA vials free of headspace? Yes___ No___ NA___ Sample ID's and containers affected:
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	✓			Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided?	✓			
13	COC form is properly signed in relinquished/received sections?	✓			Circle Applicable: Not relinquished Other (describe)

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials SH Date 11/14/19 Page 1 of 1

GL-CHL-SR-001 Rev 6

List of current GEL Certifications as of 05 December 2019

State	Certification
Alaska	17−018
Alaska Drinking Water	SC00012
Arkansas	88−0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH−0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330−15−00283, P330−15−00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C−SC−01
Kansas NELAP	E−10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2019020
Maryland	270
Massachusetts	M−SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE−OS−26−13
Nevada	SC000122020−1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R−158
Oklahoma	2019−165
Pennsylvania NELAP	68−00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235−19−15
Utah NELAP	SC000122019−29
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

LC-MS/MS Analysis

Case Narrative

LCMSMS-Misc
Technical Case Narrative
EA Engineering, Science, and Technology, Inc., PBC
SDG #: 496272

Product: **The Extraction and Analysis of Per and Polyfluroalkyl Substances Using LCMSMS**
Analytical Method: EPA 537.1 Mod, PFAS, Compliant with QSM Table B-15
Analytical Procedure: GL-OA-E-076 REV# 8
Analytical Batch: 1940542

Preparation Method: EPA 537.1 Modified
Preparation Procedure: GL-OA-E-076 REV# 8
Preparation Batch: 1940541

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
496272001	NFARS-FTA-2019-SS10
496272002	NFARS-FTA-2019-SS11
496272003	NFARS-FTA-2019-SB11 (2-3)
496272004	NFARS-FTA-2019-SS12
496272005	NFARS-FTA-2019-SB12 (3-4)
496272006	NFARS-FTA-2019-SS13
496272007	NFARS-FTA-2019-SB13 (2-3)
496272008	NFARS-FTA-2019-SS14
496272009	NFARS-FTA-2019-SB14 (2-4)
496272010	NFARS-FTA-2019-SS15
496272011	NFARS-FTA-2019-SB15 (2-3)
496272012	NFARS-FTA-2019-SS16
496272013	NFARS-FTA-2019-SB16 (3-4)
496272014	NFARS-FTA-2019-SS17
496272015	NFARS-FTA-2019-SB17 (3-4)
496272016	NFARS-FTA-2019-S-FD01
496272017	NFARS-FTA-2019-S-FD02
496272018	NFARS-FTA-2019-S-FD03
496272019	NFARS-FTA-2019-S-FD04
1204436117	Method Blank (MB)
1204436118	Laboratory Control Sample (LCS)
1204436119	496272001(NFARS-FTA-2019-SS10) Matrix Spike (MS)
1204436120	496272001(NFARS-FTA-2019-SS10) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Matrix Spike (MS) Recovery Statement

The MS or MSD (See Below) recovered spiked analytes outside of the established acceptance limits. As similar recoveries were displayed in the MS and MSD, the failures were attributed to sample matrix interference and the data were reported.

Sample	Analyte	Value
1204436119 (NFARS-FTA-2019-SS10MS)	Perfluorohexanesulfonate (PFHxS)	0* (71%-144%)
	Perfluorooctanesulfonate (PFOS)	0* (63%-149%)
1204436120 (NFARS-FTA-2019-SS10MSD)	Perfluorohexanesulfonate (PFHxS)	0* (71%-144%)
	Perfluorooctanesulfonate (PFOS)	0* (63%-149%)

MS/MSD Relative Percent Difference (RPD) Statement
The RPD values between the MS and MSD (See Below) were not within the acceptance limits. Since all other RPD values met acceptance criteria, the noted exceptions are attributed to vagaries in the extraction process. The data are reported.

Sample	Analyte	Value
1204436119MS and 1204436120MSD (NFARS-FTA-2019-SS10)	Fluorotelomer sulfonate 6:2 (6:2 FTS)	RPD 46* (0%-30%)
	Fluorotelomer sulfonate 8:2 (8:2 FTS)	RPD 33* (0%-30%)
	N-methylperfluoro-1-octanesulfonamidoacetic acid	RPD 45* (0%-30%)
	Perfluorobutyric acid (PFBA)	RPD 37* (0%-30%)
	Perfluorodecanesulfonate (PFDS)	RPD 31* (0%-30%)
	Perfluorodecanoic acid (PFDA)	RPD 33* (0%-30%)
	Perfluorododecanoic acid (PFDoA)	RPD 36* (0%-30%)
	Perfluorononanoic acid (PFNA)	RPD 34* (0%-30%)
	Perfluorooctanesulfonate (PFOS)	RPD 44* (0%-30%)
	Perfluorotetradecanoic acid (PFTeDA)	RPD 42* (0%-30%)
	Perfluoroundecanoic acid (PFUdA)	RPD 31* (0%-30%)

Technical Information

Sample Dilutions
The following samples were diluted to bring the over range concentrations within the calibration range. 1204436119 (NFARS-FTA-2019-SS10MS), 1204436120 (NFARS-FTA-2019-SS10MSD), 496272001 (NFARS-FTA-2019-SS10), 496272006 (NFARS-FTA-2019-SS13), 496272007 (NFARS-FTA-2019-SB13 (2-3)), 496272008 (NFARS-FTA-2019-SS14), 496272009 (NFARS-FTA-2019-SB14 (2-4)), 496272011

(NFARS-FTA-2019-SB15 (2-3)) and 496272019 (NFARS-FTA-2019-S-FD04).

Analyte	496272						
	001	**006**	**007**	**008**	**009**	**011**	**019**
Fluorotelomer sulfonate 6:2 (6:2 FTS)	1X	1X	5X	1X	1X	1X	1X
Perfluorohexanesulfonate (PFHxS)	1X	1X	1X	1X	5X	1X	5X
Perfluorooctanesulfonate (PFOS)	5X	10X	1X	50X	1X	5X	1X

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Qualifier Definition Report
for

ESAT001 EA Engineering, Science, and Technology, Inc., PBC

Client SDG: 496272 GEL Work Order: 496272

The Qualifiers in this report are defined as follows:

* Indicates that a quality control analyte recovery is outside of specified acceptance criteria.

** Indicates the analyte is a surrogate compound.

J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit or indicates that the analyte recovery in the MS or MSD is outside of specified acceptance criteria.

U Indicates the target analyte was analyzed for but not detected above the detection limit.

DL Indicates that sample is diluted.

RA Indicates that sample is re-analyzed without re-extraction.

RE Indicates that sample is re-extracted.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: Nik-Cole A. Elmore **Name: Nik-Cole Elmore**

Date: 05 DEC 2019 **Title: Analyst II**

Sample Data Summary

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/12/2019 13:50**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272001**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**19.7**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SS10DL**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**5**
Run Date:	**11/27/2019 15:27**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.39 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019234.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*	J	69.4	ng/g	1.04	2.08	2.61

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/12/2019 13:50**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272001**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**19.7**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SS10**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/27/2019 17:52**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.39 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019251.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	UJ	0.813	ng/g	0.406	0.813	1.04
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	UJ	0.802	ng/g	0.401	0.802	1.04
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.573	ng/g	0.287	0.573	1.04
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	UJ	0.688	ng/g	0.344	0.688	1.04
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	J	0.495	ng/g	0.172	0.344	0.521
375-22-4	Perfluorobutyric acid (PFBA)	J	1.73	ng/g	0.208	0.417	0.521
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	UJ	0.344	ng/g	0.172	0.344	0.521
335-76-2	Perfluorodecanoic acid (PFDA)	UJ	0.771	ng/g	0.386	0.771	1.04
307-55-1	Perfluorododecanoic acid (PFDoA)	UJ	0.344	ng/g	0.172	0.344	0.521
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*		0.794	ng/g	0.193	0.386	0.521
375-85-9	Perfluoroheptanoic acid (PFHpA)		0.964	ng/g	0.172	0.344	0.521
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*	J	21.6	ng/g	0.172	0.344	0.521
307-24-4	Perfluorohexanoic acid (PFHxA)		4.57	ng/g	0.208	0.417	0.521
375-95-1	Perfluorononanoic acid (PFNA)	J	1.04	ng/g	0.172	0.344	0.521
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.344	ng/g	0.172	0.344	0.521
335-67-1	Perfluorooctanoic acid (PFOA)		3.39	ng/g	0.208	0.417	0.521
2706-90-3	Perfluoropentanoic acid (PFPeA)		3.48	ng/g	0.172	0.344	0.521
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	UJ	0.417	ng/g	0.208	0.417	0.521
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.344	ng/g	0.172	0.344	0.521
2058-94-8	Perfluoroundecanoic acid (PFUdA)	UJ	0.344	ng/g	0.172	0.344	0.521

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/12/2019 14:20**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272002**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**23.8**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SS11**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/27/2019 16:01**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.62 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019238.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	J	0.392	ng/g	0.391	0.781	1.00
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.771	ng/g	0.385	0.771	1.00
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.551	ng/g	0.275	0.551	1.00
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.661	ng/g	0.330	0.661	1.00
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*		2.81	ng/g	0.165	0.330	0.501
375-22-4	Perfluorobutyric acid (PFBA)		1.88	ng/g	0.200	0.401	0.501
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.330	ng/g	0.165	0.330	0.501
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.741	ng/g	0.370	0.741	1.00
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.330	ng/g	0.165	0.330	0.501
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	J	0.419	ng/g	0.185	0.370	0.501
375-85-9	Perfluoroheptanoic acid (PFHpA)		3.10	ng/g	0.165	0.330	0.501
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		21.7	ng/g	0.165	0.330	0.501
307-24-4	Perfluorohexanoic acid (PFHxA)		6.83	ng/g	0.200	0.401	0.501
375-95-1	Perfluorononanoic acid (PFNA)	J	0.241	ng/g	0.165	0.330	0.501
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.330	ng/g	0.165	0.330	0.501
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		14.1	ng/g	0.200	0.401	0.501
335-67-1	Perfluorooctanoic acid (PFOA)		2.73	ng/g	0.200	0.401	0.501
2706-90-3	Perfluoropentanoic acid (PFPeA)		5.14	ng/g	0.165	0.330	0.501
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.401	ng/g	0.200	0.401	0.501
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.330	ng/g	0.165	0.330	0.501
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.330	ng/g	0.165	0.330	0.501

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/12/2019 14:25**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272003**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**20**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SB11 (2-3)**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/27/2019 16:09**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.45 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019239.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	J	0.727	ng/g	0.398	0.796	1.02
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.786	ng/g	0.393	0.786	1.02
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.561	ng/g	0.281	0.561	1.02
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.674	ng/g	0.337	0.674	1.02
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*		2.41	ng/g	0.168	0.337	0.510
375-22-4	Perfluorobutyric acid (PFBA)		0.804	ng/g	0.204	0.408	0.510
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.337	ng/g	0.168	0.337	0.510
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.755	ng/g	0.378	0.755	1.02
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.337	ng/g	0.168	0.337	0.510
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	0.378	ng/g	0.189	0.378	0.510
375-85-9	Perfluoroheptanoic acid (PFHpA)		1.22	ng/g	0.168	0.337	0.510
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		11.7	ng/g	0.168	0.337	0.510
307-24-4	Perfluorohexanoic acid (PFHxA)		4.26	ng/g	0.204	0.408	0.510
375-95-1	Perfluorononanoic acid (PFNA)	U	0.337	ng/g	0.168	0.337	0.510
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.337	ng/g	0.168	0.337	0.510
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		5.88	ng/g	0.204	0.408	0.510
335-67-1	Perfluorooctanoic acid (PFOA)		1.02	ng/g	0.204	0.408	0.510
2706-90-3	Perfluoropentanoic acid (PFPeA)		3.46	ng/g	0.168	0.337	0.510
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.408	ng/g	0.204	0.408	0.510
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.337	ng/g	0.168	0.337	0.510
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.337	ng/g	0.168	0.337	0.510

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/12/2019 14:40**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272004**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**12.6**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SS12**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/30/2019 10:50**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.5 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019270.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)		1.90	ng/g	0.357	0.714	0.915
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)		1.46	ng/g	0.352	0.704	0.915
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.503	ng/g	0.252	0.503	0.915
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.604	ng/g	0.302	0.604	0.915
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*		0.681	ng/g	0.151	0.302	0.457
375-22-4	Perfluorobutyric acid (PFBA)		1.83	ng/g	0.183	0.366	0.457
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.302	ng/g	0.151	0.302	0.457
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.677	ng/g	0.338	0.677	0.915
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.302	ng/g	0.151	0.302	0.457
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*		0.508	ng/g	0.169	0.338	0.457
375-85-9	Perfluoroheptanoic acid (PFHpA)		3.23	ng/g	0.151	0.302	0.457
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		3.99	ng/g	0.151	0.302	0.457
307-24-4	Perfluorohexanoic acid (PFHxA)		6.05	ng/g	0.183	0.366	0.457
375-95-1	Perfluorononanoic acid (PFNA)	J	0.288	ng/g	0.151	0.302	0.457
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.302	ng/g	0.151	0.302	0.457
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		29.5	ng/g	0.183	0.366	0.457
335-67-1	Perfluorooctanoic acid (PFOA)		3.39	ng/g	0.183	0.366	0.457
2706-90-3	Perfluoropentanoic acid (PFPeA)		7.70	ng/g	0.151	0.302	0.457
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.366	ng/g	0.183	0.366	0.457
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.302	ng/g	0.151	0.302	0.457
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.302	ng/g	0.151	0.302	0.457

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/12/2019 14:45**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272005**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**15.4**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SB12 (3-4)**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/27/2019 16:26**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.39 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019241.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	J	0.616	ng/g	0.386	0.772	0.989
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.762	ng/g	0.381	0.762	0.989
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.544	ng/g	0.272	0.544	0.989
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.653	ng/g	0.326	0.653	0.989
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*		0.574	ng/g	0.163	0.326	0.495
375-22-4	Perfluorobutyric acid (PFBA)		0.713	ng/g	0.198	0.396	0.495
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.326	ng/g	0.163	0.326	0.495
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.732	ng/g	0.366	0.732	0.989
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.326	ng/g	0.163	0.326	0.495
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	0.366	ng/g	0.183	0.366	0.495
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	0.326	ng/g	0.163	0.326	0.495
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*	J	0.296	ng/g	0.163	0.326	0.495
307-24-4	Perfluorohexanoic acid (PFHxA)		1.77	ng/g	0.198	0.396	0.495
375-95-1	Perfluorononanoic acid (PFNA)	U	0.326	ng/g	0.163	0.326	0.495
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.326	ng/g	0.163	0.326	0.495
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		0.662	ng/g	0.198	0.396	0.495
335-67-1	Perfluorooctanoic acid (PFOA)	U	0.396	ng/g	0.198	0.396	0.495
2706-90-3	Perfluoropentanoic acid (PFPeA)		2.38	ng/g	0.163	0.326	0.495
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.396	ng/g	0.198	0.396	0.495
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.326	ng/g	0.163	0.326	0.495
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.326	ng/g	0.163	0.326	0.495

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/12/2019 15:00**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272006**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**7.5**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SS13DL**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**10**
Run Date:	**11/27/2019 16:35**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.25 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019242.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		163	ng/g	1.92	3.85	4.81

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/12/2019 15:00**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272006**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**7.5**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SS13**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/27/2019 18:17**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.25 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019254.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)		17.8	ng/g	0.375	0.750	0.961
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)		17.2	ng/g	0.370	0.740	0.961
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.529	ng/g	0.264	0.529	0.961
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.634	ng/g	0.317	0.634	0.961
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*		7.85	ng/g	0.159	0.317	0.481
375-22-4	Perfluorobutyric acid (PFBA)		1.76	ng/g	0.192	0.385	0.481
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	J	0.168	ng/g	0.159	0.317	0.481
335-76-2	Perfluorodecanoic acid (PFDA)	J	0.371	ng/g	0.356	0.711	0.961
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.317	ng/g	0.159	0.317	0.481
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*		2.76	ng/g	0.178	0.356	0.481
375-85-9	Perfluoroheptanoic acid (PFHpA)		16.1	ng/g	0.159	0.317	0.481
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		30.4	ng/g	0.159	0.317	0.481
307-24-4	Perfluorohexanoic acid (PFHxA)		20.5	ng/g	0.192	0.385	0.481
375-95-1	Perfluorononanoic acid (PFNA)		3.49	ng/g	0.159	0.317	0.481
754-91-6	Perfluorooctanesulfonamide (PFOSA)	J	0.387	ng/g	0.159	0.317	0.481
335-67-1	Perfluorooctanoic acid (PFOA)		16.9	ng/g	0.192	0.385	0.481
2706-90-3	Perfluoropentanoic acid (PFPeA)		15.9	ng/g	0.159	0.317	0.481
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.385	ng/g	0.192	0.385	0.481
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	J	0.169	ng/g	0.159	0.317	0.481
2058-94-8	Perfluoroundecanoic acid (PFUdA)	J	0.344	ng/g	0.159	0.317	0.481

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/12/2019 15:05**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272007**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**15.7**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SB13 (2-3)DL**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**5**
Run Date:	**11/27/2019 16:44**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.02 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019243.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)		58.0	ng/g	2.29	4.58	5.87

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/12/2019 15:05**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272007**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**15.7**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SB13 (2-3)**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/27/2019 17:43**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.02 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019250.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)		6.17	ng/g	0.452	0.904	1.17
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.646	ng/g	0.323	0.646	1.17
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.775	ng/g	0.388	0.775	1.17
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*		1.37	ng/g	0.194	0.388	0.587
375-22-4	Perfluorobutyric acid (PFBA)		1.52	ng/g	0.235	0.470	0.587
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.388	ng/g	0.194	0.388	0.587
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.869	ng/g	0.435	0.869	1.17
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.388	ng/g	0.194	0.388	0.587
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	J	0.383	ng/g	0.217	0.435	0.587
375-85-9	Perfluoroheptanoic acid (PFHpA)		2.16	ng/g	0.194	0.388	0.587
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		6.78	ng/g	0.194	0.388	0.587
307-24-4	Perfluorohexanoic acid (PFHxA)		6.62	ng/g	0.235	0.470	0.587
375-95-1	Perfluorononanoic acid (PFNA)	J	0.246	ng/g	0.194	0.388	0.587
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.388	ng/g	0.194	0.388	0.587
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		7.06	ng/g	0.235	0.470	0.587
335-67-1	Perfluorooctanoic acid (PFOA)		4.09	ng/g	0.235	0.470	0.587
2706-90-3	Perfluoropentanoic acid (PFPeA)		5.96	ng/g	0.194	0.388	0.587
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.470	ng/g	0.235	0.470	0.587
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.388	ng/g	0.194	0.388	0.587
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.388	ng/g	0.194	0.388	0.587

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/13/2019 09:35**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272008**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**23.6**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SS14**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 20:55**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.51 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019201.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)		2.12	ng/g	0.407	0.813	1.04
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.803	ng/g	0.402	0.803	1.04
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.574	ng/g	0.287	0.574	1.04
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.688	ng/g	0.344	0.688	1.04
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	J	0.496	ng/g	0.172	0.344	0.521
375-22-4	Perfluorobutyric acid (PFBA)		2.16	ng/g	0.209	0.417	0.521
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	J	0.491	ng/g	0.172	0.344	0.521
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.772	ng/g	0.386	0.772	1.04
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.344	ng/g	0.172	0.344	0.521
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*		3.38	ng/g	0.193	0.386	0.521
375-85-9	Perfluoroheptanoic acid (PFHpA)		1.35	ng/g	0.172	0.344	0.521
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		11.3	ng/g	0.172	0.344	0.521
307-24-4	Perfluorohexanoic acid (PFHxA)		3.60	ng/g	0.209	0.417	0.521
375-95-1	Perfluorononanoic acid (PFNA)		3.70	ng/g	0.172	0.344	0.521
754-91-6	Perfluorooctanesulfonamide (PFOSA)	J	0.393	ng/g	0.172	0.344	0.521
335-67-1	Perfluorooctanoic acid (PFOA)		4.14	ng/g	0.209	0.417	0.521
2706-90-3	Perfluoropentanoic acid (PFPeA)		4.10	ng/g	0.172	0.344	0.521
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.417	ng/g	0.209	0.417	0.521
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.344	ng/g	0.172	0.344	0.521
2058-94-8	Perfluoroundecanoic acid (PFUdA)	J	0.219	ng/g	0.172	0.344	0.521

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/13/2019 09:35**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272008**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**23.6**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SS14DL**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**50**
Run Date:	**11/27/2019 16:52**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.51 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019244.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		411	ng/g	10.4	20.9	26.1

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/13/2019 09:40**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272009**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**20.4**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SB14 (2-4)**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 21:04**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.21 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019202.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)		7.92	ng/g	0.443	0.887	1.14
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.875	ng/g	0.438	0.875	1.14
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.625	ng/g	0.313	0.625	1.14
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.750	ng/g	0.375	0.750	1.14
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*		5.11	ng/g	0.188	0.375	0.568
375-22-4	Perfluorobutyric acid (PFBA)		0.973	ng/g	0.227	0.455	0.568
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.375	ng/g	0.188	0.375	0.568
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.841	ng/g	0.421	0.841	1.14
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.375	ng/g	0.188	0.375	0.568
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*		2.87	ng/g	0.210	0.421	0.568
375-85-9	Perfluoroheptanoic acid (PFHpA)		1.73	ng/g	0.188	0.375	0.568
307-24-4	Perfluorohexanoic acid (PFHxA)		6.47	ng/g	0.227	0.455	0.568
375-95-1	Perfluorononanoic acid (PFNA)	U	0.375	ng/g	0.188	0.375	0.568
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.375	ng/g	0.188	0.375	0.568
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		42.9	ng/g	0.227	0.455	0.568
335-67-1	Perfluorooctanoic acid (PFOA)		2.92	ng/g	0.227	0.455	0.568
2706-90-3	Perfluoropentanoic acid (PFPeA)		2.31	ng/g	0.188	0.375	0.568
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.455	ng/g	0.227	0.455	0.568
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.375	ng/g	0.188	0.375	0.568
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.375	ng/g	0.188	0.375	0.568

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/13/2019 09:40**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272009**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**20.4**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SB14 (2-4)DL**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**5**
Run Date:	**11/27/2019 17:01**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.21 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019245.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		64.7	ng/g	0.938	1.88	2.84

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/13/2019 10:10**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272010**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**16.3**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SS15**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 21:12**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.13 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019203.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)		8.92	ng/g	0.438	0.875	1.12
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.864	ng/g	0.432	0.864	1.12
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.617	ng/g	0.309	0.617	1.12
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.741	ng/g	0.370	0.741	1.12
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	J	0.275	ng/g	0.185	0.370	0.561
375-22-4	Perfluorobutyric acid (PFBA)	J	0.452	ng/g	0.224	0.449	0.561
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.370	ng/g	0.185	0.370	0.561
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.830	ng/g	0.415	0.830	1.12
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.370	ng/g	0.185	0.370	0.561
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	J	0.259	ng/g	0.208	0.415	0.561
375-85-9	Perfluoroheptanoic acid (PFHpA)		0.624	ng/g	0.185	0.370	0.561
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		4.66	ng/g	0.185	0.370	0.561
307-24-4	Perfluorohexanoic acid (PFHxA)		0.908	ng/g	0.224	0.449	0.561
375-95-1	Perfluorononanoic acid (PFNA)	J	0.418	ng/g	0.185	0.370	0.561
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.370	ng/g	0.185	0.370	0.561
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		25.5	ng/g	0.224	0.449	0.561
335-67-1	Perfluorooctanoic acid (PFOA)		1.41	ng/g	0.224	0.449	0.561
2706-90-3	Perfluoropentanoic acid (PFPeA)		0.683	ng/g	0.185	0.370	0.561
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.449	ng/g	0.224	0.449	0.561
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.370	ng/g	0.185	0.370	0.561
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.370	ng/g	0.185	0.370	0.561

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/13/2019 10:15**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272011**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**19**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SB15 (2-3)**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 21:21**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.08 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019204.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)		7.44	ng/g	0.463	0.926	1.19
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	J	0.514	ng/g	0.457	0.914	1.19
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.653	ng/g	0.327	0.653	1.19
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.784	ng/g	0.392	0.784	1.19
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	J	0.436	ng/g	0.196	0.392	0.594
375-22-4	Perfluorobutyric acid (PFBA)		1.16	ng/g	0.237	0.475	0.594
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	J	0.276	ng/g	0.196	0.392	0.594
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.879	ng/g	0.439	0.879	1.19
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.392	ng/g	0.196	0.392	0.594
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*		0.665	ng/g	0.220	0.439	0.594
375-85-9	Perfluoroheptanoic acid (PFHpA)		1.30	ng/g	0.196	0.392	0.594
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		9.97	ng/g	0.196	0.392	0.594
307-24-4	Perfluorohexanoic acid (PFHxA)		1.79	ng/g	0.237	0.475	0.594
375-95-1	Perfluorononanoic acid (PFNA)		1.91	ng/g	0.196	0.392	0.594
754-91-6	Perfluorooctanesulfonamide (PFOSA)	J	0.512	ng/g	0.196	0.392	0.594
335-67-1	Perfluorooctanoic acid (PFOA)		3.17	ng/g	0.237	0.475	0.594
2706-90-3	Perfluoropentanoic acid (PFPeA)		1.73	ng/g	0.196	0.392	0.594
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.475	ng/g	0.237	0.475	0.594
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.392	ng/g	0.196	0.392	0.594
2058-94-8	Perfluoroundecanoic acid (PFUdA)		0.647	ng/g	0.196	0.392	0.594

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/13/2019 10:15**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272011**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**19**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SB15 (2-3)DL**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**5**
Run Date:	**11/27/2019 17:09**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.08 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019246.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		73.0	ng/g	1.19	2.37	2.97

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/13/2019 11:00**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272012**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**19.9**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SS16**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 21:29**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.09 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019205.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	0.932	ng/g	0.466	0.932	1.20
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.920	ng/g	0.460	0.920	1.20
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.657	ng/g	0.329	0.657	1.20
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.789	ng/g	0.394	0.789	1.20
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	U	0.394	ng/g	0.197	0.394	0.598
375-22-4	Perfluorobutyric acid (PFBA)	J	0.452	ng/g	0.239	0.478	0.598
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.394	ng/g	0.197	0.394	0.598
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.884	ng/g	0.442	0.884	1.20
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.394	ng/g	0.197	0.394	0.598
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	0.442	ng/g	0.221	0.442	0.598
375-85-9	Perfluoroheptanoic acid (PFHpA)	J	0.283	ng/g	0.197	0.394	0.598
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		1.27	ng/g	0.197	0.394	0.598
307-24-4	Perfluorohexanoic acid (PFHxA)	J	0.553	ng/g	0.239	0.478	0.598
375-95-1	Perfluorononanoic acid (PFNA)	U	0.394	ng/g	0.197	0.394	0.598
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.394	ng/g	0.197	0.394	0.598
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		1.86	ng/g	0.239	0.478	0.598
335-67-1	Perfluorooctanoic acid (PFOA)		0.760	ng/g	0.239	0.478	0.598
2706-90-3	Perfluoropentanoic acid (PFPeA)	J	0.296	ng/g	0.197	0.394	0.598
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.478	ng/g	0.239	0.478	0.598
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.394	ng/g	0.197	0.394	0.598
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.394	ng/g	0.197	0.394	0.598

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/13/2019 11:05**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272013**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**16.6**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SB16 (3-4)**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 21:38**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.02 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019206.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	0.926	ng/g	0.463	0.926	1.19
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.914	ng/g	0.457	0.914	1.19
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.653	ng/g	0.327	0.653	1.19
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.784	ng/g	0.392	0.784	1.19
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	U	0.392	ng/g	0.196	0.392	0.594
375-22-4	Perfluorobutyric acid (PFBA)	J	0.283	ng/g	0.237	0.475	0.594
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.392	ng/g	0.196	0.392	0.594
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.879	ng/g	0.439	0.879	1.19
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.392	ng/g	0.196	0.392	0.594
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	0.439	ng/g	0.220	0.439	0.594
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	0.392	ng/g	0.196	0.392	0.594
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*	U	0.392	ng/g	0.196	0.392	0.594
307-24-4	Perfluorohexanoic acid (PFHxA)	U	0.475	ng/g	0.237	0.475	0.594
375-95-1	Perfluorononanoic acid (PFNA)	U	0.392	ng/g	0.196	0.392	0.594
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.392	ng/g	0.196	0.392	0.594
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*	U	0.475	ng/g	0.237	0.475	0.594
335-67-1	Perfluorooctanoic acid (PFOA)	U	0.475	ng/g	0.237	0.475	0.594
2706-90-3	Perfluoropentanoic acid (PFPeA)	U	0.392	ng/g	0.196	0.392	0.594
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.475	ng/g	0.237	0.475	0.594
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.392	ng/g	0.196	0.392	0.594
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.392	ng/g	0.196	0.392	0.594

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/13/2019 10:35**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272014**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**25**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SS17**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 21:46**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.11 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019207.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	0.986	ng/g	0.493	0.986	1.26
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.973	ng/g	0.487	0.973	1.26
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.695	ng/g	0.348	0.695	1.26
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.834	ng/g	0.417	0.834	1.26
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	U	0.417	ng/g	0.209	0.417	0.632
375-22-4	Perfluorobutyric acid (PFBA)	J	0.373	ng/g	0.253	0.506	0.632
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.417	ng/g	0.209	0.417	0.632
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.935	ng/g	0.468	0.935	1.26
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.417	ng/g	0.209	0.417	0.632
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	0.468	ng/g	0.234	0.468	0.632
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	0.417	ng/g	0.209	0.417	0.632
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		0.914	ng/g	0.209	0.417	0.632
307-24-4	Perfluorohexanoic acid (PFHxA)	J	0.377	ng/g	0.253	0.506	0.632
375-95-1	Perfluorononanoic acid (PFNA)	U	0.417	ng/g	0.209	0.417	0.632
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.417	ng/g	0.209	0.417	0.632
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		2.26	ng/g	0.253	0.506	0.632
335-67-1	Perfluorooctanoic acid (PFOA)	J	0.287	ng/g	0.253	0.506	0.632
2706-90-3	Perfluoropentanoic acid (PFPeA)	J	0.215	ng/g	0.209	0.417	0.632
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.506	ng/g	0.253	0.506	0.632
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.417	ng/g	0.209	0.417	0.632
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.417	ng/g	0.209	0.417	0.632

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/13/2019 10:40**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272015**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**17.5**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-SB17 (3-4)**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 21:55**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.09 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019208.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	J	0.724	ng/g	0.453	0.905	1.16
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.893	ng/g	0.447	0.893	1.16
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.638	ng/g	0.319	0.638	1.16
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.766	ng/g	0.383	0.766	1.16
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	U	0.383	ng/g	0.191	0.383	0.580
375-22-4	Perfluorobutyric acid (PFBA)	J	0.236	ng/g	0.232	0.464	0.580
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.383	ng/g	0.191	0.383	0.580
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.859	ng/g	0.429	0.859	1.16
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.383	ng/g	0.191	0.383	0.580
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	0.429	ng/g	0.215	0.429	0.580
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	0.383	ng/g	0.191	0.383	0.580
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*	U	0.383	ng/g	0.191	0.383	0.580
307-24-4	Perfluorohexanoic acid (PFHxA)	U	0.464	ng/g	0.232	0.464	0.580
375-95-1	Perfluorononanoic acid (PFNA)	U	0.383	ng/g	0.191	0.383	0.580
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.383	ng/g	0.191	0.383	0.580
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*	U	0.464	ng/g	0.232	0.464	0.580
335-67-1	Perfluorooctanoic acid (PFOA)	U	0.464	ng/g	0.232	0.464	0.580
2706-90-3	Perfluoropentanoic acid (PFPeA)	U	0.383	ng/g	0.191	0.383	0.580
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.464	ng/g	0.232	0.464	0.580
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.383	ng/g	0.191	0.383	0.580
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.383	ng/g	0.191	0.383	0.580

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/12/2019 12:00**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272016**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**20.1**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-S-FD01**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/27/2019 17:35**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.15 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019249.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	J	0.722	ng/g	0.454	0.909	1.16
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.897	ng/g	0.448	0.897	1.16
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.641	ng/g	0.320	0.641	1.16
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.769	ng/g	0.384	0.769	1.16
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*		1.57	ng/g	0.192	0.384	0.582
375-22-4	Perfluorobutyric acid (PFBA)	J	0.284	ng/g	0.233	0.466	0.582
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.384	ng/g	0.192	0.384	0.582
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.862	ng/g	0.431	0.862	1.16
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.384	ng/g	0.192	0.384	0.582
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	0.431	ng/g	0.216	0.431	0.582
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	0.384	ng/g	0.192	0.384	0.582
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		3.64	ng/g	0.192	0.384	0.582
307-24-4	Perfluorohexanoic acid (PFHxA)	U	0.466	ng/g	0.233	0.466	0.582
375-95-1	Perfluorononanoic acid (PFNA)	U	0.384	ng/g	0.192	0.384	0.582
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.384	ng/g	0.192	0.384	0.582
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		0.661	ng/g	0.233	0.466	0.582
335-67-1	Perfluorooctanoic acid (PFOA)	U	0.466	ng/g	0.233	0.466	0.582
2706-90-3	Perfluoropentanoic acid (PFPeA)	U	0.384	ng/g	0.192	0.384	0.582
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.466	ng/g	0.233	0.466	0.582
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.384	ng/g	0.192	0.384	0.582
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.384	ng/g	0.192	0.384	0.582

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/12/2019 12:00**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272017**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**18.2**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-S-FD02**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 22:20**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.38 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019211.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	J	0.766	ng/g	0.401	0.801	1.03
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.791	ng/g	0.395	0.791	1.03
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.565	ng/g	0.282	0.565	1.03
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.678	ng/g	0.339	0.678	1.03
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	J	0.173	ng/g	0.169	0.339	0.514
375-22-4	Perfluorobutyric acid (PFBA)	J	0.349	ng/g	0.205	0.411	0.514
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.339	ng/g	0.169	0.339	0.514
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.760	ng/g	0.380	0.760	1.03
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.339	ng/g	0.169	0.339	0.514
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	0.380	ng/g	0.190	0.380	0.514
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	0.339	ng/g	0.169	0.339	0.514
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		2.13	ng/g	0.169	0.339	0.514
307-24-4	Perfluorohexanoic acid (PFHxA)	J	0.371	ng/g	0.205	0.411	0.514
375-95-1	Perfluorononanoic acid (PFNA)	U	0.339	ng/g	0.169	0.339	0.514
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.339	ng/g	0.169	0.339	0.514
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		4.14	ng/g	0.205	0.411	0.514
335-67-1	Perfluorooctanoic acid (PFOA)	J	0.277	ng/g	0.205	0.411	0.514
2706-90-3	Perfluoropentanoic acid (PFPeA)	J	0.270	ng/g	0.169	0.339	0.514
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.411	ng/g	0.205	0.411	0.514
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.339	ng/g	0.169	0.339	0.514
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.339	ng/g	0.169	0.339	0.514

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/12/2019 12:00**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272018**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**20.6**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-S-FD03**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 22:29**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.25 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019212.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)		1.90	ng/g	0.437	0.873	1.12
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.862	ng/g	0.431	0.862	1.12
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.616	ng/g	0.308	0.616	1.12
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.739	ng/g	0.369	0.739	1.12
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	J	0.358	ng/g	0.185	0.369	0.560
375-22-4	Perfluorobutyric acid (PFBA)	J	0.480	ng/g	0.224	0.448	0.560
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.369	ng/g	0.185	0.369	0.560
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.828	ng/g	0.414	0.828	1.12
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.369	ng/g	0.185	0.369	0.560
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	0.414	ng/g	0.207	0.414	0.560
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	0.369	ng/g	0.185	0.369	0.560
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		1.85	ng/g	0.185	0.369	0.560
307-24-4	Perfluorohexanoic acid (PFHxA)	J	0.241	ng/g	0.224	0.448	0.560
375-95-1	Perfluorononanoic acid (PFNA)	U	0.369	ng/g	0.185	0.369	0.560
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.369	ng/g	0.185	0.369	0.560
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		0.711	ng/g	0.224	0.448	0.560
335-67-1	Perfluorooctanoic acid (PFOA)	U	0.448	ng/g	0.224	0.448	0.560
2706-90-3	Perfluoropentanoic acid (PFPeA)	J	0.263	ng/g	0.185	0.369	0.560
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.448	ng/g	0.224	0.448	0.560
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.369	ng/g	0.185	0.369	0.560
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.369	ng/g	0.185	0.369	0.560

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/13/2019 12:00**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272019**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**20**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-S-FD04**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/22/2019 22:37**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.01 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019213.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)		3.15	ng/g	0.485	0.970	1.24
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	0.957	ng/g	0.479	0.957	1.24
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	0.684	ng/g	0.342	0.684	1.24
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	0.821	ng/g	0.410	0.821	1.24
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*		5.45	ng/g	0.205	0.410	0.622
375-22-4	Perfluorobutyric acid (PFBA)		1.19	ng/g	0.249	0.497	0.622
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	0.410	ng/g	0.205	0.410	0.622
335-76-2	Perfluorodecanoic acid (PFDA)	U	0.920	ng/g	0.460	0.920	1.24
307-55-1	Perfluorododecanoic acid (PFDoA)	U	0.410	ng/g	0.205	0.410	0.622
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*		2.61	ng/g	0.230	0.460	0.622
375-85-9	Perfluoroheptanoic acid (PFHpA)		2.30	ng/g	0.205	0.410	0.622
307-24-4	Perfluorohexanoic acid (PFHxA)		7.72	ng/g	0.249	0.497	0.622
375-95-1	Perfluorononanoic acid (PFNA)	J	0.235	ng/g	0.205	0.410	0.622
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	0.410	ng/g	0.205	0.410	0.622
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*		43.9	ng/g	0.249	0.497	0.622
335-67-1	Perfluorooctanoic acid (PFOA)		3.30	ng/g	0.249	0.497	0.622
2706-90-3	Perfluoropentanoic acid (PFPeA)		2.67	ng/g	0.205	0.410	0.622
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	0.497	ng/g	0.249	0.497	0.622
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.410	ng/g	0.205	0.410	0.622
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	0.410	ng/g	0.205	0.410	0.622

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496272**	**Date Collected:**	**11/13/2019 12:00**	**Matrix:**	**SOIL**
Lab Sample ID:	**496272019**	**Date Received:**	**11/14/2019 09:10**	**%Moisture:**	**20**
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-S-FD04DL**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1940542**	**Inst:**	**LCMSMS9**	**Dilution:**	**5**
Run Date:	**11/27/2019 17:18**	**Analyst:**	**JLS**		
Prep Date:	**11/20/2019 07:30**	**Aliquot:**	**2.01 g**	**Final Volume:**	**10 mL**
Data File:	**PFC112019247.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*		65.1	ng/g	1.03	2.05	3.11

Packing Slip:

EA Engineering, Science, and Technology, Inc., PBC
NFARS West End Electrical
SDG: 496277
Attn:Lindsay Mairs

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Chain of Custody and Supporting Documentation.....7

DODQSM Cover Sheet

DOD-QSM Cover Sheet

NFARS West End Electrical

December 03, 2019

GEL Laboratories, LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Project Manager: Julie Robinson
Phone Extension: 4289
Email: Julie.Robinson@gel.com

Contract Purchase Order: 19623

Work Order: 496277 **SDG:** 496277

Client Contact:
Lindsay Mairs
EA Engineering, Science, and Technology, Inc., PBC
269 W. Jefferson Street
Syracuse, New York 13202

Project Identification: NFARS West End Electrical

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

GEL appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on November 14, 2019. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures. If you have any questions, please do not hesitate to contact me at the phone number or e-mail address listed above.

Sincerely,

Julie Robinson
Project Manager

Case Narrative

DODQSM Case Narrative
for
EA Engineering, Science, and Technology, Inc., PBC
SDG: 496277

December 03, 2019

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary

Sample Receipt The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on November 14, 2019 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

Laboratory ID	Client ID
496277001	NFARS-FTA-2019-EB-01
496277002	NFARS-FTA-2019-EB-02
496277003	NFARS-FTA-2019-EB-03
496277004	NFARS-FTA-2019-EB-04
496277005	NFARS-FTA-2019-TB-01
496277006	NFARS-FTA-2019-TB-02
496277007	NFARS-FTA-2019-FB-01
496277008	NFARS-FTA-2019-FB-02

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: LCMSMS-Misc.

Julie Robinson
Project Manager

Chain of Custody and Supporting Documentation

Cooler 1 of 2

Page: 1 of 5 | Project # Leo Daly | GEL Quote #: EA(RVKA19-0734) | COC Number (1): – | PO Number: 19623

496267
496272
496277

GEL Laboratories LLC
Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

GEL Work Order Number:

GEL Project Manager:

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: EA Engineering | Phone # 716-243-6227

Project/Site Name: NFARS West End Project | Fax # –

Address: Lockport Rd Niagara Falls, NY

Collected By: Lindsay Mairs | Send Results To: lmairs@eaest.com

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Should this sample be considered: Radioactive (Please supply isotopic info.)	Should this sample be considered: (7) Known or possible hazards	Total number of containers	Full Parts Target Analyte List + TAL + 23	<-- Preservative Type (6)
NFARS-FTA-2019-SS01	11/12/19	1255			Soil	No	No	1	X	
NFARS-FTA-2019-SB01 (2-3)		1300						1		
NFARS-FTA-2019-SS02		1230						1		
NFARS-FTA-2019-SB02 (3-4)		1235						1		
NFARS-FTA-2019-SS03		1000						1		
NFARS-FTA-2019-SB03 (3-4)		1005						1		
NFARS-FTA-2019-SS04		1015						1		
NFARS-FTA-2019-SB04 (3-4)		1020						1		
NFARS-FTA-2019-SS05		1200						1		
NFARS-FTA-2019-SB05 (2-3)	11/12/19	1205			Soil	No	No	1	X	
~~NFARS-FTA-2019~~										

Comments
Note: extra sample is required for sample specific QC

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1 [signature]	11/13/19	1830	1 [signature]	11/14/19	9:10
2			2		
3			3		

TAT Requested: Normal: X Rush: ____ Specify: ____ (Subject to Surcharge)

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4

Additional Remarks: ERPIMS NYDEC EDD CAT B

For Lab Receiving Use Only: *Custody Seal Intact?* [ ] *Yes* [ ] *No* ***Cooler Temp:*** ____ °C

> ***For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)***

Sample Collection Time Zone: [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other: ____

1.) Chain of Custody Number = Client Determined

2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite

3.) Field Filtered: For liquid matrices, indicate with a - **Y** - for yes the sample was field filtered or - **N** - for sample was not field filtered.

4.) Matrix Codes: **DW**=Drinking Water, **GW**=Groundwater, **SW**=Surface Water, **WW**=Waste Water, **W**=Water, **ML**=Misc Liquid, **SO**=Soil, **SD**=Sediment, **SL**=Sludge, **SS**=Solid Waste, **O**=Oil, **F**=Filter, **P**=Wipe, **U**=Urine, **F**=Fecal, **N**=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B, 6010B/7470A**) and number of containers provided for each (i.e. *8260B* - **3**, *6010B 7470A* - **1**).

6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) *Are there any known or possible hazards associated with these samples?*

RCRA Metals
As = Arsenic **Hg**= Mercury
Ba = Barium **Se**= Selenium
Cd = Cadmium **Ag**= Silver
Cr = Chromium **MR**= Miscellaneous RCRA metals
Pb = Lead

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. *(i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)*

ME Chain of Custody
2 no coolers

Page: 2 of 5
Project #: Leo Daly
GEL Quote #: EA (QRVKQ19-0034)
COC Number (1): —
PO Number: 19623

GEL Laboratories LLC
gel.com
Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

GEL Work Order Number:
GEL Project Manager:

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: EA
Phone # 716-248-6227
Project/Site Name: NFARS Western
Fax #
Address: Sauk
Collected By: LM
Send Results To: lmarks@eaest.com

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Should this sample be considered: Radioactive (Please supply isotopic info.)	Should this sample be considered: (7) Known or possible hazards	Total number of containers	Full PFAS Target Analyte List + EPA 537	<-- Preservative Type (6)	Comments
NFARS-FTA-2019-SS06	11/12/19	1045	MS/MSD		Soil	No	No	3	X		Note: extra sample is required for sample specific QC
NFARS-FTA-2019-SB06 (3-4)		1050						1			
NFARS-FTA-2019-SS07		1130						1			
NFARS-FTA-2019-SB07 (2-3)		1135						1			
NFARS-FTA-2019-SS08		1105						1			
NFARS-FTA-2019-SB08 (3-4)		1110						1			
NFARS-FTA-2019-SS09		1510						1			
NFARS-FTA-2019-SB09 (3-4)		1515						1			
NFARS-FTA-2019-SS10		1350	MS/MSD					3			
NFARS-FTA-2019-SB10 (3-4)	11/12/19	1400			Soil	No	No	1	X		

~~NFARS-FTA-2019~~

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1	11/13/19	1800	1 A. Mann	11/14/19	9:10
2			2		
3			3		

TAT Requested: Normal: X Rush: ____ Specify: ____ (Subject to Surcharge)

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4

Additional Remarks: EFARMS NYSDEC EDD CAT B

For Lab Receiving Use Only: *Custody Seal Intact?* [ ] Yes [ ] No **Cooler Temp:** ____ °C

> ***For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)***

Sample Collection Time Zone: [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other: ____

1.) Chain of Custody Number = Client Determined

2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite

3.) Field Filtered: For liquid matrices, indicate with a **- Y -** for yes the sample was field filtered or **- N -** for sample was not field filtered.

4.) Matrix Codes: **DW**=Drinking Water, **GW**=Groundwater, **SW**=Surface Water, **WW**=Waste Water, **W**=Water, **ML**=Misc Liquid, **SO**=Soil, **SD**=Sediment, **SL**=Sludge, **SS**=Solid Waste, **O**=Oil, **F**=Filter, **P**=Wipe, **U**=Urine, **F**=Fecal, **N**=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B, 6010B/7470A**) and number of containers provided for each (i.e. *8260B* **- 3**, *6010B 7470A* **- 1**).

6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) *Are there any known or possible hazards associated with these samples?*

RCRA Metals
As = Arsenic **Hg**= Mercury
Ba = Barium **Se**= Selenium
Cd = Cadmium **Ag**= Silver
Cr = Chromium **MR**= Miscellaneous
Pb = Lead RCRA metals

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. *(i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)*

Page: 3 of 5 (Cont.)
Project # Leo Daly
GEL Quote #: Some
COC Number (1): —
PO Number: 196223

GEL Laboratories LLC
gel.com
Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

GEL Work Order Number: GEL Project Manager:

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: EA Phone # 716-243-6227
Project/Site Name: NFARS Fax # —
Address: Some
Collected By: LM Send Results To: lmarsaccast

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Should this sample be considered: Radioactive (Please supply isotopic info.)	(7) Known or possible hazards	Total number of containers	X GULFCAS Toward Dakar 12+ COAST	<-- Preservative Type (6)
NFARS-FTA-2019-SS11	11/12/19	1420			Soil	No	No	1	X	
NFARS-FTA-2019-SB11 (2-3)		1425						1		
NFARS-FTA-2019-SS12		1440						1		
NFARS-FTA-2019-SB12 (3-4)		1445						1		
NFARS-FTA-2019-SS13		1500						1		
NFARS-FTA-2019-SB13 (2-3)	11/12/19	1505						1		
NFARS-FTA-2019-SS14	11/13/19	0935						1		
NFARS-FTA-2019-SB14 (2-4)	11/13/19	0940						1		
NFARS-FTA-2019-SS15	11/13/19	1010						1		
NFARS-FTA-2019-SB15 (2-3)	11/13/19	1015			Soil	No	No	1	X	

Comments
Note: extra sample is required for sample specific QC

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
T. Lamberson	11/13/19	1000	1 A. Allen	11/14/19	9:10
2			2		
3			3		

TAT Requested: Normal: X Rush: ____ Specify: ____ (Subject to Surcharge)

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4

Additional Remarks: ERPIMS NYSDEC E.DD CAT B

For Lab Receiving Use Only: *Custody Seal Intact?* [ ] *Yes* [ ] *No* ***Cooler Temp:*** ____ °C

> ***For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)***

Sample Collection Time Zone: [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other: ____

1.) Chain of Custody Number = Client Determined

2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite

3.) Field Filtered: For liquid matrices, indicate with a **- Y -** for yes the sample was field filtered or **- N -** for sample was not field filtered.

4.) Matrix Codes: **DW**=Drinking Water, **GW**=Groundwater, **SW**=Surface Water, **WW**=Waste Water, **W**=Water, **ML**=Misc Liquid, **SO**=Soil, **SD**=Sediment, **SL**=Sludge, **SS**=Solid Waste, **O**=Oil, **F**=Filter, **P**=Wipe, **U**=Urine, **F**=Fecal, **N**=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B, 6010B/7470A**) and number of containers provided for each (i.e. *8260B* - **3**, *6010B 7470A* - **1**).

6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) *Are there any known or possible hazards associated with these samples?*

RCRA Metals
As = Arsenic **Hg**= Mercury
Ba = Barium **Se**= Selenium
Cd = Cadmium **Ag**= Silver
Cr = Chromium **MR**= Miscellaneous
Pb = Lead RCRA metals

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. *(i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)*

SEE CHAIN OF CUSTODY FOR ADDITIONAL COMMENTS

Page: 4 of 5
Project #
GEL Quote #: GAAL
COC Number [1]:
PO Number: 19623

GEL Laboratories LLC

Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

GEL Work Order Number: **GEL Project Manager:**

Client Name: EA Phone # 716-2436227
Project/Site Name: NFARS West End Fax # —
Address: Same
Collected By: LM Send Results To: lmairs@eaest.com

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Radioactive (Please supply isotopic info.)	(7) Known or possible hazards	Total number of containers	XEPA (full)	Target Analyte	1st EPA 537	Comments
NFARS-FTA-2019-SS16	11/13/19	1100			SOIL	No	No	1	X			
NFARS-FTA-2019-SB16 (3-4)	11/13/19	1105						1				
NFARS-FTA-2019-SS17	11/13/19	1035						1				
NFARS-FTA-2019-SB17 (3-4)	11/13/19	1040						1				
NFARS-FTA-2019-S-FD01	11/12/19	—	FD					1				
NFARS-FTA-2019-S-FD02	11/12/19	—	FD					1				
NFARS-FTA-2019-S-FD03	11/12/19	—	FD					1				
NFARS-FTA-2019-S-FD04	11/13/19	—	FD		SOIL			1				
NFARS-FTA-2019-EB-01	11/12/19	1520	EB		W			2				Equipment Blank
NFARS-FTA-2019-EB-02	11/12/19	1525	EB		W	No	No	2	X			Equipment Blank

<-- Preservative Type (6)

Comments
Note: extra sample is required for sample specific QC

Chain of Custody Signatures

	Relinquished By (Signed)	Date	Time		Received by (signed)	Date	Time
1	[signature]	11/13/19	1830	1	A. Allman	11/14/19	9:10
2				2			
3				3			

TAT Requested: Normal: X Rush: ____ Specify: ________ **(Subject to Surcharge)**
Fax Results: [ ] Yes [ ] No
Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4
Additional Remarks: ERPIMS, NYSDEC EDD CAT B
For Lab Receiving Use Only: *Custody Seal Intact?* [ ] *Yes* [ ] *No* ***Cooler Temp:*** ____°C

> For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)
Sample Collection Time Zone: [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other: ________

1.) Chain of Custody Number = Client Determined
2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite
3.) Field Filtered: For liquid matrices, indicate with a - **Y** - for yes the sample was field filtered or - **N** - for sample was not field filtered.
4.) Matrix Codes: **DW**=Drinking Water, **GW**=Groundwater, **SW**=Surface Water, **WW**=Waste Water, **W**=Water, **ML**=Misc Liquid, **SO**=Soil, **SD**=Sediment, **SL**=Sludge, **SS**=Solid Waste, **O**=Oil, **F**=Filter, **P**=Wipe, **U**=Urine, **F**=Fecal, **N**=Nasal
5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B, 6010B/7470A**) and number of containers provided for each (i.e. *8260B* **- 3**, *6010B 7470A* **- 1**).
6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank
7.) *Are there any known or possible hazards associated with these samples?*

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. *(i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)*

RCRA Metals
As = Arsenic **Hg**= Mercury
Ba = Barium **Se**= Selenium
Cd = Cadmium **Ag**= Silver
Cr = Chromium **MR**= Miscellaneous RCRA metals
Pb = Lead

TSCA Regulated
PCB = Polychlorinated biphenyls

Page: 5 of 5
Project # Leo Daly
GEL Quote #: SAMPLES
COC Number (1):
PO Number: 19623

GEL Laboratories LLC
gel.com | Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

GEL Work Order Number: GEL Project Manager:

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: EA Phone # 716-243-6225
Project/Site Name: NFARS West End Fax #
Address: Scane
Collected By: LM Send Results To: lmaas@peaest.com

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date/time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Should this sample be considered: Radioactive (Please supply isotopic info.)	Should this sample be considered: (7) Known or possible hazards	Total number of containers	EPA 6010 Full Inorganics List	EPA 537	<-- Preservative Type (6)	Comments
NFARS-FTA-2019-EB-03	11/13/19	1135	EB		W	No	No	2	X			Equipment Blank
NFARS-FTA-2019-EB-04	11/13/19	1140	EB		W			2				Equipment Blank
NFARS-FTA-2019TB-01	11/12/19	0800	TB		W			2				Trip Blank
NFARS-FTA-2019TB-02	11/13/19	0800	TB		W			2				Trip Blank
NFARS-FTA-2019FB-01	11/12/19	0945	FB		W			2				Field Blank
NFARS-FTA-2019FB-02	11/13/19	0920	FB		W	No	No	2	X			Field Blank

Chain of Custody Signatures

	Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1		11/13/19	1830	A. Allen	11/14/19	9:10
2						
3						

TAT Requested: Normal: ____ Rush: ____ Specify: _____ (Subject to Surcharge)

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4

Additional Remarks:

For Lab Receiving Use Only: *Custody Seal Intact?* [ ] *Yes* [ ] *No* ***Cooler Temp:*** ____ °C

> ***For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)***

Sample Collection Time Zone: [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other: _____

1.) Chain of Custody Number = Client Determined

2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite

3.) Field Filtered: For liquid matrices, indicate with a **- Y -** for yes the sample was field filtered or **- N -** for sample was not field filtered.

4.) Matrix Codes: **DW**=Drinking Water, **GW**=Groundwater, **SW**=Surface Water, **WW**=Waste Water, **W**=Water, **ML**=Misc Liquid, **SO**=Soil, **SD**=Sediment, **SL**=Sludge, **SS**=Solid Waste, **O**=Oil, **F**=Filter, **P**=Wipe, **U**=Urine, **F**=Fecal, **N**=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B**, **6010B/7470A**) and number of containers provided for each (i.e. *8260B* **- 3**, *6010B 7470A* **- 1**).

6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

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Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. *(i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)*

496 267
496 272
496 277

GEL Laboratories LLC

JF

SAMPLE RECEIPT & REVIEW FORM

Client: ESAT	**SDG/AR/COC/Work Order:**
Received By: AJA	**Date Received:** 11/14/19
Carrier and Tracking Number	Circle Applicable: (FedEx Express) FedEx Ground UPS Field Services Courier Other 7780 1186 4257 (2 coolers)

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#: If UN2910, Is the Radioactive Shipment Survey Compliant? Yes___ No___
B) Did the client designate the samples are to be received as radioactive?		✓	COC notation or radioactive stickers on containers equal client designation.
C) Did the RSO classify the samples as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3
D) Did the client designate samples are hazardous?		✓	COC notation or hazard labels on containers equal client designation.
E) Did the RSO identify possible hazards?		✓	If D or E is yes, select Hazards below. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	✓			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	✓			Preservation Method: (Wet Ice) Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP: 1°
4	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: IR4-16 Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?		✓		Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?			✓	If Yes, are Encores or Soil Kits present for solids? Yes___ No___ NA___(If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes___ No___ NA___(If unknown, select No) Are liquid VOA vials free of headspace? Yes___ No___ NA___ Sample ID's and containers affected:
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	✓			Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided?	✓			
13	COC form is properly signed in relinquished/received sections?	✓			Circle Applicable: Not relinquished Other (describe)

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials SH Date 11/14/19 Page 1 of 1

GL-CHL-SR-001 Rev 6

List of current GEL Certifications as of 03 December 2019

State	Certification
Alaska	17−018
Alaska Drinking Water	SC00012
Arkansas	88−0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH−0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330−15−00283, P330−15−00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C−SC−01
Kansas NELAP	E−10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2019020
Maryland	270
Massachusetts	M−SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE−OS−26−13
Nevada	SC000122020−1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R−158
Oklahoma	2019−165
Pennsylvania NELAP	68−00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235−19−15
Utah NELAP	SC000122019−29
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

LC-MS/MS Analysis

Case Narrative

LCMSMS-Misc
Technical Case Narrative
EA Engineering, Science, and Technology, Inc., PBC
SDG #: 496277

Product: **The Extraction and Analysis of Per and Polyfluroalkyl Substances Using LCMSMS**
Analytical Method: EPA 537.1 Mod, PFAS, Compliant with QSM Table B-15
Analytical Procedure: GL-OA-E-076 REV# 8
Analytical Batches: 1938872 and 1938870

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
496277001	NFARS-FTA-2019-EB-01
496277002	NFARS-FTA-2019-EB-02
496277003	NFARS-FTA-2019-EB-03
496277004	NFARS-FTA-2019-EB-04
496277005	NFARS-FTA-2019-TB-01
496277006	NFARS-FTA-2019-TB-02
496277007	NFARS-FTA-2019-FB-01
496277008	NFARS-FTA-2019-FB-02
1204432229	Method Blank (MB)
1204432230	Laboratory Control Sample (LCS)
1204432231	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Miscellaneous Information

Additional Comments
Additional volume was not provided for sample QC.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Qualifier Definition Report
for

ESAT001 EA Engineering, Science, and Technology, Inc., PBC

Client SDG: 496277 GEL Work Order: 496277

The Qualifiers in this report are defined as follows:

* Indicates that a quality control analyte recovery is outside of specified acceptance criteria.
** Indicates the analyte is a surrogate compound.
Q LCS recovery not within control limits
U Indicates the target analyte was analyzed for but not detected above the detection limit.

DL Indicates that sample is diluted.
RA Indicates that sample is re-analyzed without re-extraction.
RE Indicates that sample is re-extracted.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: Nik-Cole A. Elmore **Name: Nik-Cole Elmore**

Date: 27 NOV 2019 **Title: Analyst II**

Sample Data Summary

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496277**	**Date Collected:**	**11/12/2019 15:20**	**Matrix:**	**WATER**
Lab Sample ID:	**496277001**	**Date Received:**	**11/14/2019 09:10**		
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-EB-01**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1938872**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/17/2019 21:55**	**Analyst:**	**JLS**		
Prep Date:	**11/15/2019 09:30**	**Aliquot:**	**279.18 mL**	**Final Volume:**	**5 mL**
Data File:	**PFC111619153.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	2.36	ng/L	1.18	2.36	3.40
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	2.36	ng/L	1.18	2.36	3.44
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	2.36	ng/L	1.18	2.36	3.58
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	2.36	ng/L	1.18	2.36	3.58
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	U	1.18	ng/L	0.591	1.18	1.59
375-22-4	Perfluorobutyric acid (PFBA)	U	1.43	ng/L	0.716	1.43	1.79
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	1.18	ng/L	0.591	1.18	1.74
335-76-2	Perfluorodecanoic acid (PFDA)	U	1.40	ng/L	0.698	1.40	1.79
307-55-1	Perfluorododecanoic acid (PFDoA)	U	1.18	ng/L	0.591	1.18	1.79
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	1.18	ng/L	0.591	1.18	1.70
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	1.18	ng/L	0.591	1.18	1.79
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*	U	1.18	ng/L	0.591	1.18	1.63
307-24-4	Perfluorohexanoic acid (PFHxA)	U	1.18	ng/L	0.591	1.18	1.79
375-95-1	Perfluorononanoic acid (PFNA)	U	1.18	ng/L	0.591	1.18	1.79
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	1.18	ng/L	0.591	1.18	1.79
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*	U	1.43	ng/L	0.716	1.43	1.79
335-67-1	Perfluorooctanoic acid (PFOA)	U	1.43	ng/L	0.716	1.43	1.79
2706-90-3	Perfluoropentanoic acid (PFPeA)	U	1.18	ng/L	0.591	1.18	1.79
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	1.43	ng/L	0.716	1.43	1.79
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	1.18	ng/L	0.591	1.18	1.79
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	1.18	ng/L	0.591	1.18	1.79

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496277**	**Date Collected:**	**11/12/2019 15:25**	**Matrix:**	**WATER**
Lab Sample ID:	**496277002**	**Date Received:**	**11/14/2019 09:10**		
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-EB-02**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1938872**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/17/2019 22:05**	**Analyst:**	**JLS**		
Prep Date:	**11/15/2019 09:30**	**Aliquot:**	**284.66 mL**	**Final Volume:**	**5 mL**
Data File:	**PFC111619154.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	2.32	ng/L	1.16	2.32	3.34
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	2.32	ng/L	1.16	2.32	3.37
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	2.32	ng/L	1.16	2.32	3.51
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	2.32	ng/L	1.16	2.32	3.51
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	U	1.16	ng/L	0.580	1.16	1.56
375-22-4	Perfluorobutyric acid (PFBA)	U	1.41	ng/L	0.703	1.41	1.76
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	1.16	ng/L	0.580	1.16	1.70
335-76-2	Perfluorodecanoic acid (PFDA)	U	1.37	ng/L	0.685	1.37	1.76
307-55-1	Perfluorododecanoic acid (PFDoA)	U	1.16	ng/L	0.580	1.16	1.76
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	1.16	ng/L	0.580	1.16	1.67
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	1.16	ng/L	0.580	1.16	1.76
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*	U	1.16	ng/L	0.580	1.16	1.60
307-24-4	Perfluorohexanoic acid (PFHxA)	U	1.16	ng/L	0.580	1.16	1.76
375-95-1	Perfluorononanoic acid (PFNA)	U	1.16	ng/L	0.580	1.16	1.76
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	1.16	ng/L	0.580	1.16	1.76
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*	U	1.41	ng/L	0.703	1.41	1.76
335-67-1	Perfluorooctanoic acid (PFOA)	U	1.41	ng/L	0.703	1.41	1.76
2706-90-3	Perfluoropentanoic acid (PFPeA)	U	1.16	ng/L	0.580	1.16	1.76
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	1.41	ng/L	0.703	1.41	1.76
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	1.16	ng/L	0.580	1.16	1.76
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	1.16	ng/L	0.580	1.16	1.76

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496277**	**Date Collected:**	**11/13/2019 11:35**	**Matrix:**	**WATER**
Lab Sample ID:	**496277003**	**Date Received:**	**11/14/2019 09:10**		
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-EB-03**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1938872**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/17/2019 22:14**	**Analyst:**	**JLS**		
Prep Date:	**11/15/2019 09:30**	**Aliquot:**	**279.52 mL**	**Final Volume:**	**5 mL**
Data File:	**PFC111619155.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	2.36	ng/L	1.18	2.36	3.40
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	2.36	ng/L	1.18	2.36	3.43
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	2.36	ng/L	1.18	2.36	3.58
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	2.36	ng/L	1.18	2.36	3.58
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	U	1.18	ng/L	0.590	1.18	1.59
375-22-4	Perfluorobutyric acid (PFBA)	U	1.43	ng/L	0.716	1.43	1.79
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	1.18	ng/L	0.590	1.18	1.74
335-76-2	Perfluorodecanoic acid (PFDA)	U	1.40	ng/L	0.698	1.40	1.79
307-55-1	Perfluorododecanoic acid (PFDoA)	U	1.18	ng/L	0.590	1.18	1.79
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	1.18	ng/L	0.590	1.18	1.70
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	1.18	ng/L	0.590	1.18	1.79
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*	U	1.18	ng/L	0.590	1.18	1.63
307-24-4	Perfluorohexanoic acid (PFHxA)	U	1.18	ng/L	0.590	1.18	1.79
375-95-1	Perfluorononanoic acid (PFNA)	U	1.18	ng/L	0.590	1.18	1.79
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	1.18	ng/L	0.590	1.18	1.79
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*	U	1.43	ng/L	0.716	1.43	1.79
335-67-1	Perfluorooctanoic acid (PFOA)	U	1.43	ng/L	0.716	1.43	1.79
2706-90-3	Perfluoropentanoic acid (PFPeA)	U	1.18	ng/L	0.590	1.18	1.79
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	1.43	ng/L	0.716	1.43	1.79
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	1.18	ng/L	0.590	1.18	1.79
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	1.18	ng/L	0.590	1.18	1.79

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496277**	**Date Collected:**	**11/13/2019 11:40**	**Matrix:**	**WATER**
Lab Sample ID:	**496277004**	**Date Received:**	**11/14/2019 09:10**		
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-EB-04**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1938872**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/17/2019 22:23**	**Analyst:**	**JLS**		
Prep Date:	**11/15/2019 09:30**	**Aliquot:**	**283.03 mL**	**Final Volume:**	**5 mL**
Data File:	**PFC111619156.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	2.33	ng/L	1.17	2.33	3.36
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	2.33	ng/L	1.17	2.33	3.39
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	2.33	ng/L	1.17	2.33	3.53
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	2.33	ng/L	1.17	2.33	3.53
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	U	1.17	ng/L	0.583	1.17	1.57
375-22-4	Perfluorobutyric acid (PFBA)	U	1.41	ng/L	0.707	1.41	1.77
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	1.17	ng/L	0.583	1.17	1.71
335-76-2	Perfluorodecanoic acid (PFDA)	U	1.38	ng/L	0.689	1.38	1.77
307-55-1	Perfluorododecanoic acid (PFDoA)	U	1.17	ng/L	0.583	1.17	1.77
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	1.17	ng/L	0.583	1.17	1.68
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	1.17	ng/L	0.583	1.17	1.77
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*	U	1.17	ng/L	0.583	1.17	1.61
307-24-4	Perfluorohexanoic acid (PFHxA)	U	1.17	ng/L	0.583	1.17	1.77
375-95-1	Perfluorononanoic acid (PFNA)	U	1.17	ng/L	0.583	1.17	1.77
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	1.17	ng/L	0.583	1.17	1.77
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*	U	1.41	ng/L	0.707	1.41	1.77
335-67-1	Perfluorooctanoic acid (PFOA)	U	1.41	ng/L	0.707	1.41	1.77
2706-90-3	Perfluoropentanoic acid (PFPeA)	U	1.17	ng/L	0.583	1.17	1.77
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	1.41	ng/L	0.707	1.41	1.77
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	1.17	ng/L	0.583	1.17	1.77
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	1.17	ng/L	0.583	1.17	1.77

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496277**	**Date Collected:**	**11/12/2019 08:00**	**Matrix:**	**WATER**
Lab Sample ID:	**496277005**	**Date Received:**	**11/14/2019 09:10**		
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-TB-01**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1938872**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/17/2019 22:41**	**Analyst:**	**JLS**		
Prep Date:	**11/15/2019 09:30**	**Aliquot:**	**287.27 mL**	**Final Volume:**	**5 mL**
Data File:	**PFC111619158.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	2.30	ng/L	1.15	2.30	3.31
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	2.30	ng/L	1.15	2.30	3.34
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	2.30	ng/L	1.15	2.30	3.48
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	2.30	ng/L	1.15	2.30	3.48
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	U	1.15	ng/L	0.574	1.15	1.55
375-22-4	Perfluorobutyric acid (PFBA)	U	1.39	ng/L	0.696	1.39	1.74
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	1.15	ng/L	0.574	1.15	1.69
335-76-2	Perfluorodecanoic acid (PFDA)	U	1.36	ng/L	0.679	1.36	1.74
307-55-1	Perfluorododecanoic acid (PFDoA)	U	1.15	ng/L	0.574	1.15	1.74
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	1.15	ng/L	0.574	1.15	1.65
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	1.15	ng/L	0.574	1.15	1.74
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*	U	1.15	ng/L	0.574	1.15	1.58
307-24-4	Perfluorohexanoic acid (PFHxA)	U	1.15	ng/L	0.574	1.15	1.74
375-95-1	Perfluorononanoic acid (PFNA)	U	1.15	ng/L	0.574	1.15	1.74
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	1.15	ng/L	0.574	1.15	1.74
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*	U	1.39	ng/L	0.696	1.39	1.74
335-67-1	Perfluorooctanoic acid (PFOA)	U	1.39	ng/L	0.696	1.39	1.74
2706-90-3	Perfluoropentanoic acid (PFPeA)	U	1.15	ng/L	0.574	1.15	1.74
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	1.39	ng/L	0.696	1.39	1.74
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	1.15	ng/L	0.574	1.15	1.74
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	1.15	ng/L	0.574	1.15	1.74

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496277**	**Date Collected:**	**11/13/2019 08:00**	**Matrix:**	**WATER**
Lab Sample ID:	**496277006**	**Date Received:**	**11/14/2019 09:10**		
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-TB-02**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1938872**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/17/2019 22:50**	**Analyst:**	**JLS**		
Prep Date:	**11/15/2019 09:30**	**Aliquot:**	**277.94 mL**	**Final Volume:**	**5 mL**
Data File:	**PFC111619159.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	2.37	ng/L	1.19	2.37	3.42
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	2.37	ng/L	1.19	2.37	3.45
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	2.37	ng/L	1.19	2.37	3.60
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	2.37	ng/L	1.19	2.37	3.60
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	U	1.19	ng/L	0.594	1.19	1.60
375-22-4	Perfluorobutyric acid (PFBA)	U	1.44	ng/L	0.720	1.44	1.80
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	1.19	ng/L	0.594	1.19	1.74
335-76-2	Perfluorodecanoic acid (PFDA)	U	1.40	ng/L	0.702	1.40	1.80
307-55-1	Perfluorododecanoic acid (PFDoA)	U	1.19	ng/L	0.594	1.19	1.80
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	1.19	ng/L	0.594	1.19	1.71
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	1.19	ng/L	0.594	1.19	1.80
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*	U	1.19	ng/L	0.594	1.19	1.64
307-24-4	Perfluorohexanoic acid (PFHxA)	U	1.19	ng/L	0.594	1.19	1.80
375-95-1	Perfluorononanoic acid (PFNA)	U	1.19	ng/L	0.594	1.19	1.80
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	1.19	ng/L	0.594	1.19	1.80
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*	U	1.44	ng/L	0.720	1.44	1.80
335-67-1	Perfluorooctanoic acid (PFOA)	U	1.44	ng/L	0.720	1.44	1.80
2706-90-3	Perfluoropentanoic acid (PFPeA)	U	1.19	ng/L	0.594	1.19	1.80
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	1.44	ng/L	0.720	1.44	1.80
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	1.19	ng/L	0.594	1.19	1.80
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	1.19	ng/L	0.594	1.19	1.80

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496277**	**Date Collected:**	**11/12/2019 09:45**	**Matrix:**	**WATER**
Lab Sample ID:	**496277007**	**Date Received:**	**11/14/2019 09:10**		
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-FB-01**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1938872**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/17/2019 22:59**	**Analyst:**	**JLS**		
Prep Date:	**11/15/2019 09:30**	**Aliquot:**	**279.64 mL**	**Final Volume:**	**5 mL**
Data File:	**PFC111619160.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	2.36	ng/L	1.18	2.36	3.40
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	2.36	ng/L	1.18	2.36	3.43
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	2.36	ng/L	1.18	2.36	3.58
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	2.36	ng/L	1.18	2.36	3.58
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	U	1.18	ng/L	0.590	1.18	1.59
375-22-4	Perfluorobutyric acid (PFBA)	U	1.43	ng/L	0.715	1.43	1.79
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	1.18	ng/L	0.590	1.18	1.73
335-76-2	Perfluorodecanoic acid (PFDA)	U	1.39	ng/L	0.697	1.39	1.79
307-55-1	Perfluorododecanoic acid (PFDoA)	U	1.18	ng/L	0.590	1.18	1.79
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	1.18	ng/L	0.590	1.18	1.70
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	1.18	ng/L	0.590	1.18	1.79
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*	U	1.18	ng/L	0.590	1.18	1.63
307-24-4	Perfluorohexanoic acid (PFHxA)	U	1.18	ng/L	0.590	1.18	1.79
375-95-1	Perfluorononanoic acid (PFNA)	U	1.18	ng/L	0.590	1.18	1.79
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	1.18	ng/L	0.590	1.18	1.79
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*	U	1.43	ng/L	0.715	1.43	1.79
335-67-1	Perfluorooctanoic acid (PFOA)	U	1.43	ng/L	0.715	1.43	1.79
2706-90-3	Perfluoropentanoic acid (PFPeA)	U	1.18	ng/L	0.590	1.18	1.79
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	1.43	ng/L	0.715	1.43	1.79
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	1.18	ng/L	0.590	1.18	1.79
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	1.18	ng/L	0.590	1.18	1.79

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**496277**	**Date Collected:**	**11/13/2019 09:20**	**Matrix:**	**WATER**
Lab Sample ID:	**496277008**	**Date Received:**	**11/14/2019 09:10**		
		Client:	**ESAT001**	**Project:**	**ESAT00219**
Client ID:	**NFARS-FTA-2019-FB-02**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**1938872**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**11/17/2019 23:08**	**Analyst:**	**JLS**		
Prep Date:	**11/15/2019 09:30**	**Aliquot:**	**282.4 mL**	**Final Volume:**	**5 mL**
Data File:	**PFC111619161.wiff**				

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
27619-97-2	Fluorotelomer sulfonate 6:2 (6:2 FTS)	U	2.34	ng/L	1.17	2.34	3.36
39108-34-4	Fluorotelomer sulfonate 8:2 (8:2 FTS)	U	2.34	ng/L	1.17	2.34	3.40
2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) *N-ethylperfluoro-1-octanesulfonam*	U	2.34	ng/L	1.17	2.34	3.54
2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSA *N-methylperfluoro-1-octanesulfon*	U	2.34	ng/L	1.17	2.34	3.54
375-73-5	Perfluorobutanesulfonic acid (PFBS) *Perfluorobutanesulfonate (PFBS)*	U	1.17	ng/L	0.584	1.17	1.58
375-22-4	Perfluorobutyric acid (PFBA)	U	1.42	ng/L	0.708	1.42	1.77
335-77-3	Perfluorodecanesulfonic acid (PFDS) *Perfluorodecanesulfonate (PFDS)*	U	1.17	ng/L	0.584	1.17	1.72
335-76-2	Perfluorodecanoic acid (PFDA)	U	1.38	ng/L	0.691	1.38	1.77
307-55-1	Perfluorododecanoic acid (PFDoA)	U	1.17	ng/L	0.584	1.17	1.77
375-92-8	Perfluoroheptanesulfonic acid (PFHpS) *Perfluoroheptanesulfonate (PFHpS*	U	1.17	ng/L	0.584	1.17	1.68
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	1.17	ng/L	0.584	1.17	1.77
355-46-4	Perfluorohexanesulfonic acid (PFHxS) *Perfluorohexanesulfonate (PFHxS)*	U	1.17	ng/L	0.584	1.17	1.61
307-24-4	Perfluorohexanoic acid (PFHxA)	U	1.17	ng/L	0.584	1.17	1.77
375-95-1	Perfluorononanoic acid (PFNA)	U	1.17	ng/L	0.584	1.17	1.77
754-91-6	Perfluorooctanesulfonamide (PFOSA)	U	1.17	ng/L	0.584	1.17	1.77
1763-23-1	Perfluorooctanesulfonic acid (PFOS) *Perfluorooctanesulfonate (PFOS)*	U	1.42	ng/L	0.708	1.42	1.77
335-67-1	Perfluorooctanoic acid (PFOA)	U	1.42	ng/L	0.708	1.42	1.77
2706-90-3	Perfluoropentanoic acid (PFPeA)	U	1.17	ng/L	0.584	1.17	1.77
376-06-7	Perfluorotetradecanoic acid (PFTeDA)	U	1.42	ng/L	0.708	1.42	1.77
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	1.17	ng/L	0.584	1.17	1.77
2058-94-8	Perfluoroundecanoic acid (PFUdA)	U	1.17	ng/L	0.584	1.17	1.77

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Attachment D

Data Usability Summary Report

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DATA VALIDATION REPORT

NFARS West End Project

November 2019
Per and Polyfluoroalkyl Substances

GEL Laboratories SDG: 496267, 469272, and 496277

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ENVIRONMENTAL DATA SERVICES, LTD.

DATA VALIDATION REPORT FOR PER-FLUORINATED COMPOUNDS

SITE: NFARS West End Project

LABORATORY: GEL Laboratories

SAMPLE DELIVERY GROUP: 496267, 469272, and 496277

MATRIX: Soil

VALIDATION LEVEL: 4

This sample delivery group consists of the following samples:

Client Sample ID	Laboratory Sample ID	Client Sample ID	Laboratory Sample ID
NFARS-FTA-2019-SS01	496267001	NFARS-FTA-2019-SB12 (3-4)	496272005
NFARS-FTA-2019-SB01 (2-3)	496267002	NFARS-FTA-2019-SS13	496272006
NFARS-FTA-2019-SS02	496267003	NFARS-FTA-2019-SB13 (2-3)	496272007
NFARS-FTA-2019-SB02 (3-4)	496267004	NFARS-FTA-2019-SS14	496272008
NFARS-FTA-2019-SS03	496267005	NFARS-FTA-2019-SB14 (2-4)	496272009
NFARS-FTA-2019-SB03 (3-4)	496267006	NFARS-FTA-2019-SS15	496272010
NFARS-FTA-2019-SS04	496267007	NFARS-FTA-2019-SB15 (2-3)	496272011
NFARS-FTA-2019-SB04 (3-4)	496267008	NFARS-FTA-2019-SS16	496272012
NFARS-FTA-2019-SS05	496267009	NFARS-FTA-2019-SB16 (3-4)	496272013
NFARS-FTA-2019-SB05 (2-3)	496267010	NFARS-FTA-2019-SS17	496272014
NFARS-FTA-2019-SS06	496267011	NFARS-FTA-2019-SB17 (3-4)	496272015
NFARS-FTA-2019-SB06 (3-4)	496267012	NFARS-FTA-2019-S-FD01	496272016
NFARS-FTA-2019-SS07	496267013	NFARS-FTA-2019-S-FD02	496272017
NFARS-FTA-2019-SB07 (2-3)	496267014	NFARS-FTA-2019-S-FD03	496272018
NFARS-FTA-2019-SS08	496267015	NFARS-FTA-2019-S-FD04	496272019
NFARS-FTA-2019-SB08 (3-4)	496267016	NFARS-FTA-2019-EB-01	496277001
NFARS-FTA-2019-SS09	496267017	NFARS-FTA-2019-EB-02	496277002
NFARS-FTA-2019-SB09 (3-4)	496267018	NFARS-FTA-2019-EB-03	496277003
NFARS-FTA-2019-SB10 (3-4)	496267019	NFARS-FTA-2019-EB-04	496277004
NFARS-FTA-2019-SS10	496272001	NFARS-FTA-2019-TB-01	496277005
NFARS-FTA-2019-SS11	496272002	NFARS-FTA-2019-TB-02	496277006
NFARS-FTA-2019-SB11 (2-3)	496272003	NFARS-FTA-2019-FB-01	496277007
NFARS-FTA-2019-SS12	496272004	NFARS-FTA-2019-FB-02	496277008

The samples described above were analyzed via USEPA 537.1 modified to determine concentrations of selected per-fluorinated alkyl acids (PFAAs), perfluorooctanoic acids (PFOA), and perfluorooctyl sulfonates (PFOS).

Performance criteria specified in the analytical method, USEPA 537, Determination of Selected Per-fluorinated Alkyl Acids (PFAAs) in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS), Version 1.1, September 2009; Department of Defense Quality Systems Manual 5.3; as well as the USEPA National Functional Guidelines for Organic Superfund Methods Data Review, 2017, have been considered during validation of this data and its usability.

Table 1 provides a summary of major and minor data quality issues identified for this data set. All data are acceptable except those results which have been qualified with “R,” rejected. Data validation qualifiers along with associated descriptions are provided in Table 2. All data qualification related to this group of samples is detailed on the attached sheets.

All data users should note two facts. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables even as a last resort. The second, no analyte concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.”

HOLDING TIME/SAMPLE HANDLING

The amount of an analyte in a sample can change with time due to chemical instability, degradation, volatilization, etc. If the specified holding time is exceeded, the data may not be valid. Proper sample handling and preservation also play a role in the chemical stability of analytes in the sample matrix. If samples are not collected and stored using proper containers and/or preservatives, data may not be valid.

The samples in this delivery group were received by the laboratory within the proper temperature range as specified in the validation and method guidance.

The samples in this delivery group were prepared and analyzed within the holding time specified in the validation and method specified guidelines.

BLANK CONTAMINATION

Quality assurance blanks include method, storage, trip, field, or rinse blanks. Blanks are prepared to identify any contamination, which may have been introduced into the samples during laboratory preparation and analysis or field activity. Method and storage blanks measure laboratory contamination. Trip blanks measure cross contamination during shipment. Field and rinse blanks measure cross contamination during field operations.

Method Blanks

Method blanks were prepared and analyzed in association with the samples in this delivery group at the specified frequency. Upon examination of the method blank data, no analyte was positively identified at a concentration equal to or above the method detection limit (MDL) in any associated method blank.

Field Blanks

Equipment blanks, field blanks and trip blanks were submitted in association with this sample delivery group (SDG). Upon examination of the blank data, no analyte was positively identified at a concentration equal to or above the MDL. All associated field blank data are located in SDG 496277.

MASS CALIBRATION

Mass calibration range must bracket the ion masses of interest. The most recent mass calibration must be used for every acquisition in an analytical run. Mass calibration must be verified to be ±0.5 amu of the true value, by acquiring a full scan continuum mass spectrum of a PFAS

Mass calibration data were provided in the data package. All criteria were met.

CALIBRATION

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative results. The initial calibration curve demonstrates that the instrument is capable of giving acceptable performance at the beginning of an analytical sequence. The continuing calibration verifies that the instrument is continuing to provide satisfactory daily performance. Additionally, a continuing calibration is analyzed at the end of each 12-hour analytical sequence, denoted as a “closing” calibration verification and ascertains acceptable performance at the conclusion of the analytical sequence.

Percent Relative Standard Deviation and Percent Deviation

Percent relative standard deviation (%RSD) is calculated from the initial calibration and is used to indicate stability of a specific compound over the calibration range. Percent deviation (%D) compares the response factor of the continuing calibration with the mean response factor of the initial calibration. Therefore, %D is a measure of the instrument's daily performance.

The following QC criteria have been applied for this project:

The %RSD of initial calibration must be <20%.

An RSD value outside the initial calibration limit indicates the potential for quantitation errors. For this reason, all positive and non-detected results are qualified as estimated. Severe performance failures (RSD >90%) requires rejection of non-detected results.

The %D for all analytes and surrogates in the continuing calibration must be <30%.

A value outside these limits indicates the potential for detection and quantitation errors. For these reasons, all positive results are qualified as estimated "J," and non-detects are qualified with "UJ."

All initial calibration and continuing calibration %RSD and %D values were within defined QC criteria.

Note: both an opening and closing continuing calibration were performed.

INTERNAL STANDARDS PERFORMANCE

Internal standard performance criteria are meant to ensure that the liquid chromatograph/tandem mass spectrometer (LC/MS/MS) sensitivity and response are stable during every experimental run.

The internal standard area count must not vary by more than +/- 50% from the associated midlevel initial calibration standard. The retention time of the internal standard must not vary by more than +/-0.4 seconds from the associated midlevel initial calibration standard. The area count must be within -50% to 150% range of the associated standard. If area count is >150%, non-detected results are not qualified while positive results are qualified "J," estimated. When an observed area count is <50%, results are qualified "J" or "UJ" as appropriate; however, should area counts be <25%, all associated non-detects are qualified "R," rejected.

The reported sample analyses and associated method blank had internal standard areas and retention times within QC criteria in all cases.

COMPOUND IDENTIFICATION

Per-fluorinated Compounds

The project target analyte compounds are identified on the LC/MS/MS by using the analytes retention time (RT) and ion spectra. The retention times of extracted internal standards must coelute within 0.1 minutes of associated positive analyte sample responses during analysis and have ion spectra with primary and secondary characteristic ions present. In the cases where there is not an adequate ion spectrum match, the laboratory may have provided false positive identifications.

All samples were evaluated at a Stage level 4. Compound identification verification was performed at this validation level and all identification criteria were met for positive results reported.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

The matrix spike and matrix spike duplicate (MS/MSD) are generated to determine the precision and accuracy of the analytical procedure in a given sample matrix.

Sample NFARS-FTA-2019-SS06 was submitted for MS/MSD evaluation in association with this SDG. Upon evaluation all precision and accuracy indicators were favorable.

Sample NFARS-FTA-2019-SS10 was submitted for MS/MSD evaluation in association with this SDG. Upon evaluation all precision and accuracy indicators were favorable with the following exceptions. Poor precision was observed in the case of the compounds listed below.

Fluorotelomer sulfonate 6:2	Perfluorodecanesulfonate	Perfluorotetradecanoic acid
Fluorotelomer sulfonate 8:2	Perfluorodecanoic acid	Perfluoroundecanoic acid
N-methylperfluoro-1-octanesulfonamidoacetic acid	Perfluorododecanoic acid	
Perfluorobutyric acid	Perfluorononanoic acid	

Results reported for the impacted compounds in the parent sample have been qualified “J” or “UJ” as appropriate on this basis.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample (LCS) is spiked with the same analytes at the same concentrations as the matrix spike. The LCS results are used to verify that the laboratory can perform the analysis in a clean matrix.

One associated LCS evaluation was performed, all observed recoveries were found to be acceptable.

REPORTING

No dilutions, re-extractions, or other re-analyses were performed.

Contract required quantitation limits (CRQLs) achieved could not be compared to project-specific objectives as the analyses evaluated were not included in the project specific Quality Assurance Project Plan.

OTHER QUALITY CONTROL DATA OUT OF SPECIFICATION

None.

FIELD DUPLICATE

Field duplicates are two (or more) field samples collected at the same time in the same location. Each of the samples represents the same population and is carried through all steps of the sampling and analytical procedures in an identical manner. Field duplicate results are used to assess precision of the total method, including sampling, analysis, and site heterogeneity.

The following samples comprise the field duplicate pairs associated with samples in this SDG.

Parent Sample	Field Duplicate
NFARS-FTA-2019-SB06 (3-4)	NFARS-FTA-2019-S-FD01
NFARS-FTA-2019-SS08	NFARS-FTA-2019-S-FD02
NFARS-FTA-2019-SB06 (3-4)	NFARS-FTA-2019-S-FD03
NFARS-FTA-2019-SB14 (2-4)	NFARS-FTA-2019-S-FD04

Upon evaluation adequate field precision was demonstrated with the following exceptions. Poor precision was observed for Perfluorooctanesulfonic acid in the case of field duplicate pair (NFARS-FTA-2019-SS08 and NFARS-FTA-2019-S-FD02). The results reported for the impacted analyte in each of the field duplicate samples has been qualified “J” on this basis.

Poor precision was observed for Fluorotelomer sulfonate 6:2 (6:2 FTS) in the case of field duplicate pair (NFARS-FTA-2019-SB14 (2-4) and NFARS-FTA-2019-S-FD04). The results reported for the impacted analyte in each of the field duplicate samples has been qualified “J” on this basis.

SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

Overall the laboratory data generated met the project goals and quality control criteria, with the exceptions identified in this report and as summarized in Table 1.

Table 1
Review Elements Summary

	Were acceptance criteria met?		
	Yes	No	
Per-fluorinated Compounds		Major	Minor
Holding Time/Sample Handling	x		
Method Blanks	x		
Field Blanks	x		
Trip blanks	x		
Mass Calibration	x		
Calibration Percent Relative Standard Deviation and Percent Difference	x		
Internal Standards Performance	x		
Compound Identification	x		
Matrix Spike/Matrix Spike Duplicate			x
Laboratory Control Sample	x		
Other Quality Control Data out of Specification	x		
Field Duplicate			x

Major= Major data quality issue identified resulting in rejection of data.
Minor= Minor data quality issue identified resulting in the qualification of data. Data qualification should be used to inform the data users of data limitations.
NA = Not applicable

Table 2
Data Validation Qualifiers

Data Qualifier	Definition
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
UJ-	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise, and the result may be biased low.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

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