



## **SPILL UPDATE MEMORANDUM**

### **AFFF Release – Bradley Airport**

### **Farmington River Discharge**

### **Windsor, Connecticut**

**June 15, 2019**

On Saturday June 8, 2019 a release of aqueous film forming foam (AFFF) occurred at a private aircraft hangar at Bradley Airport. The release was caused by a malfunction of a fire suppression system that discharged an estimated 50,000-gallons of the foam mixed with water inside the hangar. An unknown quantity of the foam and water mixture entered into an onsite oil water separator system that ultimately discharges to the sanitary sewer. Environmental Services, Inc. (ESI) responded to the spill to recover the foam from the hangar floor and oil water separator. In addition, foam was observed at the MDC's Wastewater Treatment Plant located at 1222 Poquonock Avenue in Windsor. Foam was also observed at the plant's outfall to the Farmington River and the Connecticut Department of Energy and Environmental Protection (CTDEEP) Emergency Response Unit was notified. Figure 1 depicts the location of the spill, the MDC plant, and the associated discharge outfall to the Farmington River.

ESI deployed a boom at the outfall location in the river to prevent the migration of foam downstream of the outfall. ESI's also positioned vac-trucks at both the MDC plant and at the river outfall to capture as much foam as possible prior to it entering into the river. At the direction of the CTDEEP, on June 9, 2019, ESI personnel also collected grab samples of the foam and river water to determine if the foam contained perfluorinated substances (PFAS) typically associated with fire fighting foam. The samples were collected from the following locations:

**Upstream** - collected via boat from the Farmington River upstream of the Windsor MDC plant's outfall where the foam discharge was observed.

**Plant** - collected from the influent coming into the MDC plant. Foam was not observed in the influent or in the sample.

**Outfall** - collected via boat at the MDC outfall into the Farmington River and consisted of the foam on the surface of the water.

**Downstream-1** - collected via boat from the Farmington River near the I-91 overpass bridge, approximately 3,300 feet downstream of the MDC outfall. Foam was not observed on the river in this area or in the sample.

**Downstream-2** - collected from the Farmington River north of the Palisado Avenue overpass at the boat launch, approximately 16,390 feet south of the MDC outfall. Foam was not observed on the river in this area or in the sample.





**Disposal** - this sample was collected from ESI's vac-truck that was used to contain and recover the foam from the wastewater treatment plant and river.

The sample locations are depicted on Figures 1 through 5. The samples were collected in accordance with the Environmental Protection Agency (EPA) and Interstate Technology Regulatory Council (ITRC) guidelines for sampling PFAS. The samples were analyzed at Eurofins Lancaster Laboratories Environmental in Lancaster, Pennsylvania using EPA Method 537 Version 1.1, which includes the 24 PFAS.

As the below table indicates, total PFAS were detected at varying concentrations in all of the samples. The results are reported in nanograms per liter (ng/L), where 1 ng/L = 1 part per trillion (ppt), which is also equivalent to 0.001 ug/L (part per billion [ppb]). The EPA Health Advisory and Connecticut Department of Public Health Action Level for combined PFOS and PFOA in drinking water is 70 ppt (ng/L). There are currently no State or federal surface water protection criteria for PFOS and PFOA compounds, and currently no regulatory limits for total PFAS in groundwater, surface water, sediment, or soil.

**Table 1 – Total PFAS Detected in Samples Collected June 9, 2019**

Sample I.D/Location.:	Upstream	Plant	Outfall	Downstream-1	Downstream-2	Disposal
Total PFAS – Method 537 1.1 (ng/L)	37.72	135,998	1,515,700	13,330	10,253	9,630,830

It should be noted that perfluorooctanesulfonic acid was detected in the laboratory method blank at 2.2 ng/L, which may result in a slightly high bias of PFOS reported in the samples. The laboratory noted that the PFOS presence in the blank was caused by the elevated concentrations of PFOS present in the samples. Other laboratory quality assurance/quality control (qa/qc) non-conformances were noted, but in all instances, they did not have any impact on the data results for its intended purposes to determine if PFAS were absent/present.

From June 8 to 11, 2019 ESI recovered approximately 19,000-gallons of foam from the MDC plant and the Farmington River outfall. On June 11, ESI noted that the foam at the plant and outfall locations had dissipated and the small amount of film observed at the outfall appeared to be from normal wastewater treatment plant operations and not specifically from the AFFF. ESI recommended that the boom remain at the outfall to the river, and that the area be inspected every six hours to document if foam was present and if it necessitated removal. ESI also collected a second sample (Outfall-2) of the light film observed at the outfall on June 11, 2019 to determine if elevated concentrations of PFAS were present. In addition, ESI collected a sample of the AFFF product (Signature) that remained in the fire suppression system. The table on the following page summarizes the results of the analyses.



**Table 2 – Total PFAS Detected in Samples Collected June 10 & 11, 2019**

Sample I.D/Location.:	Outfall-2	Signature
Total PFAS – Method 537 1.1 (ng/L)	90,899.4	2,969,400,000

Pefluorohexanesulfonic acid (0.44 ng/L) and perfluorooctanesulfonic acid (3.8 ng/L) were detected in the laboratory method blank, which may result in a slightly high bias of PFOS reported in the samples. The laboratory noted that the PFOS presence in the blank was caused by the elevated concentrations of PFOS present in the samples. Other laboratory quality assurance/quality control (qa/qc) non-conformances were noted, but in all instances, they did not have any impact on the data results for its intended purposes to determine if PFAS were absent/present.

ESI's inspections from June 11 and 12, 2019 noted a minimal amount of foam that did not require removal. On June 13, 2019, foam was observed at the outfall, and removed from the boom area with the vac-truck. No additional foam removal occurred after June 13, 2019.

Table 3 displays the specific PFAS detected in each sample collected as part of ESI's spill response efforts. As the table indicates, there were no significant difference in the specific PFAS detected in the product sample (Signature) versus what was observed at the plant influent (Plant), captured by the vac-truck at the plant and river outfall (Disposal), at the outfall (Outfall & Outfall-2), and downstream (Downstream-1 and Downstream-2). The second outfall sample collected on June 11, 2019 contained significantly less total PFAS versus the June 9, 2019 outfall sample, and PFAS decreased downstream away from the spill area as the foam dispersed and was diluted. In addition, the Upstream sample confirmed that PFAS are present in the Farmington River surface water upgradient from the spill area, albeit at low concentrations. Copies of the laboratory reports for the PFAS sampling are included at the end of this document.

Based on the results of the spill response sampling, ESI recommends that the hangar area where the release occurred and the interior of the oil water separator be decontaminated to prevent any additional release of any residual AFFF to the sanitary sewer system. Foam has not been observed at the wastewater treatment plant since June 10, 2019 and it does not appear as if decontamination at the plant would be necessary. Once foam consistent with the appearance of the AFFF is not observed at the outfall, then the boom can be removed from the river.

*Cindy Knight*  
Licensed Environmental Professional

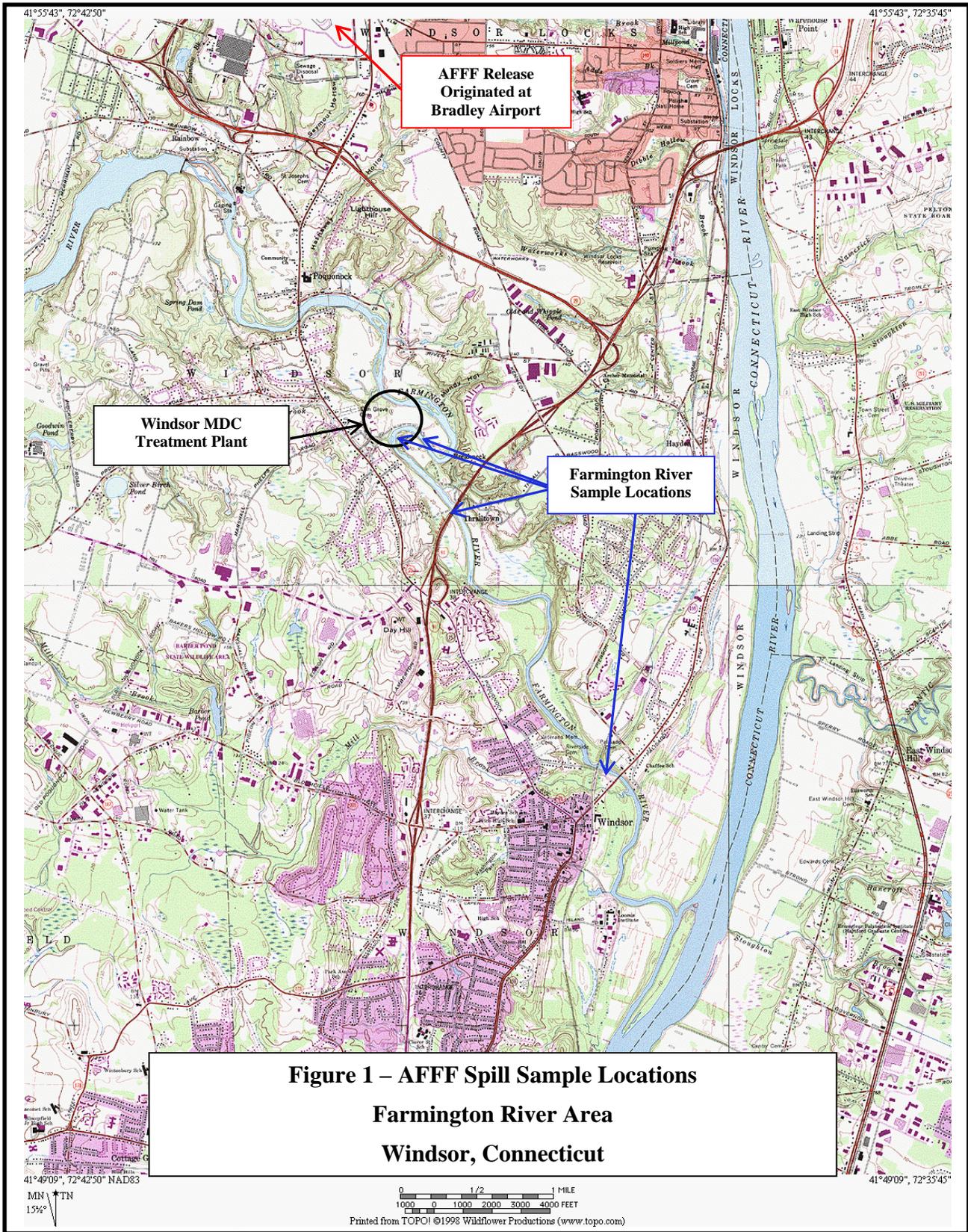
*Dustin Mitchell*  
President

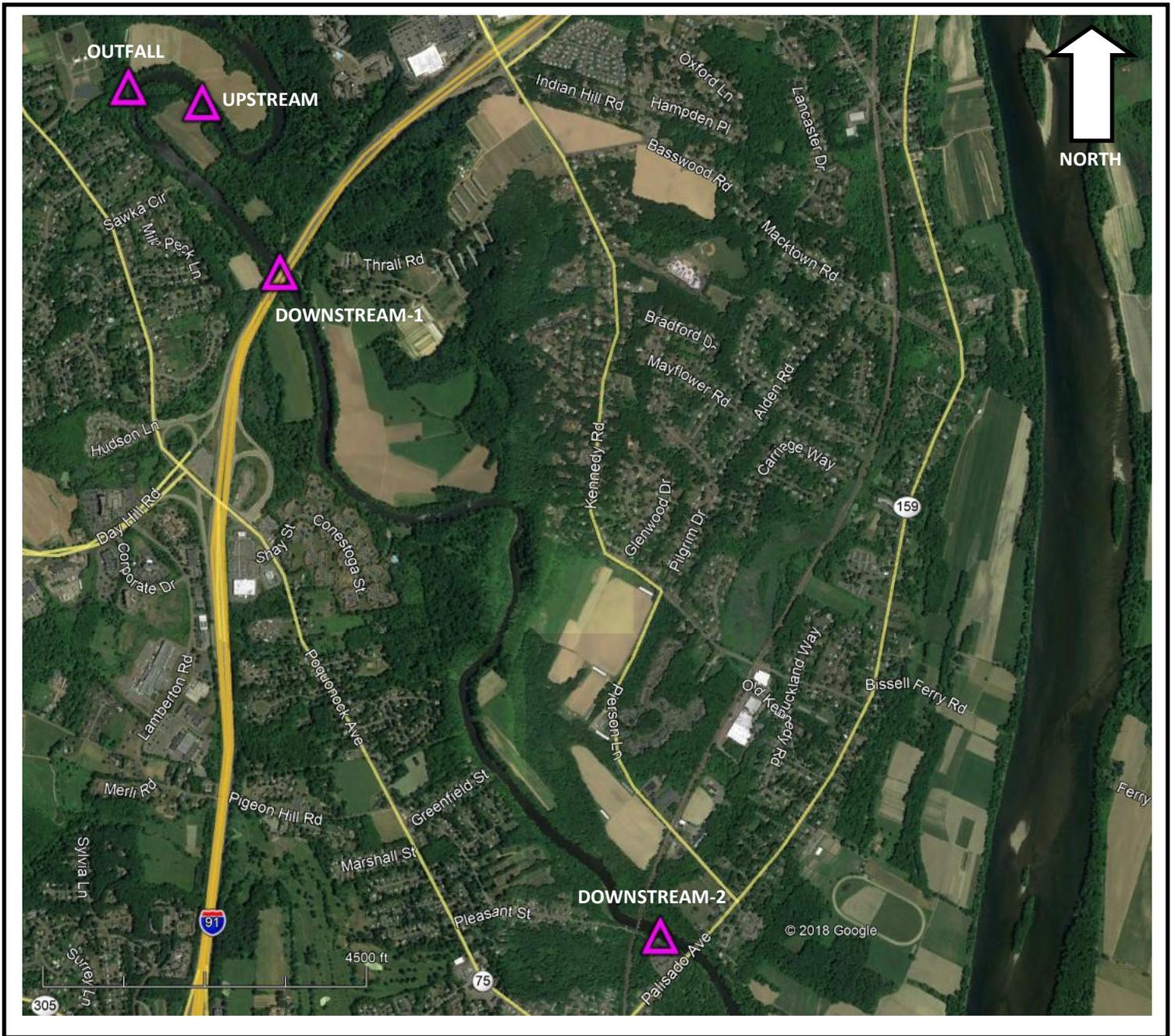


***Environmental Services, Inc.***

90 Brookfield Street South Windsor, CT 06074-1262 (860) 528-9500 (860) 289-0138 (fax)  
www.e-s-i.com

## **FIGURES**





**FIGURE 2 - Overview of Four Fire Fighting Foam Emergency Response Sampling Locations**

**June 9, 2019**

**Farmington River**

**Windsor, Connecticut**



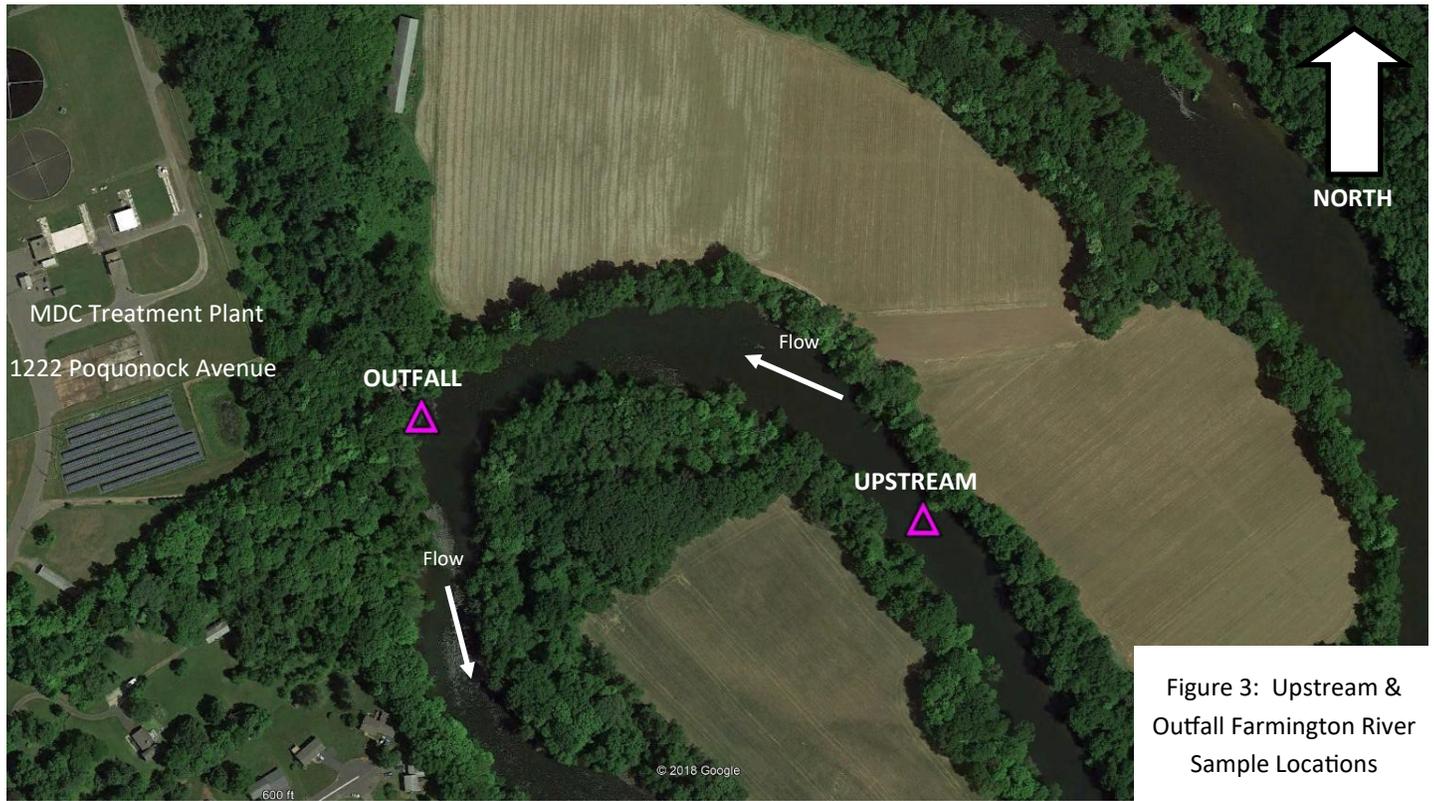


Figure 3: Upstream & Outfall Farmington River Sample Locations

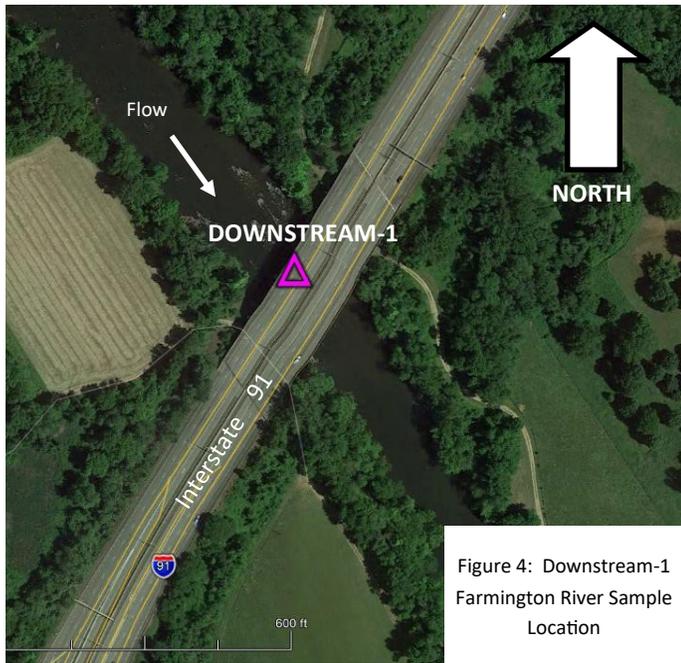


Figure 4: Downstream-1 Farmington River Sample Location

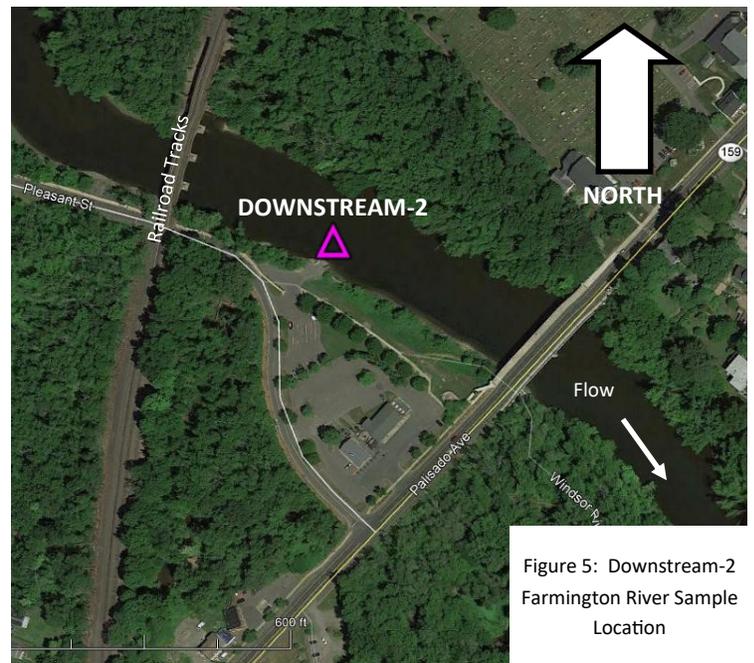


Figure 5: Downstream-2 Farmington River Sample Location

**FIGURES 3, 4 & 5 - Fire Fighting Foam Emergency Response Sampling Locations**

**June 9, 2019**

**Farmington River - Windsor, Connecticut**





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## **TABLES**

**TABLE 3**  
**AFFF Spill Sampling Data**  
**Total PFAS & Specific Compounds Detected**  
**June 9, 10 & 11, 2019**

Sample I.D.:	Signature	Disposal	Plant	Outfall	Outfall-2	Downstream-1	Downstream-2	Upstream
Sample Date:	6/10/2019	6/9/2019	6/9/2019	6/9/2019	6/11/2019	6/9/2019	6/9/2019	6/9/2019
<b>Total PFAS Detected (ng/L [ppt])</b>	<b>2,969,400,000</b>	<b>9,630,830</b>	<b>135,998</b>	<b>1,515,700</b>	<b>90,899.4</b>	<b>13,330</b>	<b>10,253</b>	<b>37.72</b>
NEtFOSAA	< 500,000	< 250	< 8.7	< 940	48	< 8.6	< 9.4	< 0.9
Perfluorobutanesulfonic acid	37,000,000	100,000	230	17,000	52	190	170	1.1
Perfluorobutanoic acid	< 1,000,000	26,000	68	5,300	18	61	57	2.0
Perfluorodecanesulfonic acid	2,600,000	530	84	< 570	86	< 5.2	< 5.6	< 0.54
Perfluoroheptanesulfonic acid	53,000,000	250,000	970	17,000	220	140	93	< 0.36
Perfluoroheptanoic acid	14,000,000	35,000	82	4,800	17	56	45	0.92
Perfluorohexanesulfonic acid	310,000,000	1,400,000	3,100	110,000	480 <sup>(2)</sup>	1,200	1,000	1.8
Perfluorohexanoic acid	26,000,000	100,000	260	17,000	70	190	180	2.3
Perfluorononanesulfonic acid	6,700,000	1,600	270	1,000	680	9.2	11	< 0.54
Perfluorononanoic acid	< 200,000	700	19	< 380	5.4	< 3.5	< 3.8	0.9
Perfluorooctanesulfonamide	300,000	< 120	5.6	< 470	25	< 4.3	< 4.7	1.2
Perfluorooctanesulfonic acid	2,400,000,000 <sup>(3)</sup>	7,300,000 <sup>(1)</sup>	130,000 <sup>(1)</sup>	1,300,000 <sup>(1)</sup>	89,000 <sup>(3)</sup>	11,000 <sup>(1)</sup>	8,300 <sup>(1)</sup>	22 <sup>(1)</sup>
Perfluorooctanoic acid	62,000,000	260,000	510	19,000	85	200	160	3.0
Perfluoropentanesulfonate	56,000,000	120,000	300	18,000	60	210	170	< 0.36
Perfluoropentanoic acid	1,800,000	37,000	91	6,600	27	74	67	2.5
Perfluoroundecanoic acid	< 200,000	< 100	8.3	< 380	26	< 3.5	< 3.8	< 0.36

- (1) This compound was detected in the laboratory method blank at a concentration of 2.2 ng/L. The reported concentration may show slight high bias.
- (2) This compound was detected in the laboratory method blank at a concentration of 0.44 ng/L. The reported concentration may show slight high bias.
- (3) This compound was detected in the laboratory method blank at a concentration of 3.8 ng/L. The reported concentration may show slight high bias.





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## **LABORATORY REPORTS**



## ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental  
2425 New Holland Pike  
Lancaster, PA 17601

Prepared for:

Environmental Services, Inc.  
90 Brookfield Street  
South Windsor CT 06074

Report Date: June 12, 2019 16:18

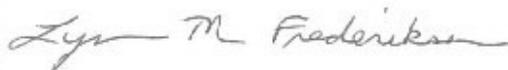
**Project: 2019-0537**

Account #: 44484  
Group Number: 2048083  
PO Number: 79197  
State of Sample Origin: CT

Electronic Copy To Environmental Services Inc.  
Electronic Copy To Environmental Services Inc.

Attn: Cindy Knight  
Attn: Dustin Mitchell

Respectfully Submitted,



Lynn M. Frederiksen  
Principal Specialist Group Leader

(717) 556-7255

To view our laboratory's current scopes of accreditation please go to <https://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/certifications-and-accreditations-eurofins-lancaster-laboratories-environmental/> . Historical copies may be requested through your project manager.



### SAMPLE INFORMATION

<u>Client Sample Description</u>	<u>Sample Collection Date/Time</u>	<u>ELLE#</u>
Upstream Grab Surface Water	06/09/2019 11:50	1076903
Outfall Grab Surface Water	06/09/2019 12:07	1076904
Plant Grab Surface Water	06/09/2019 12:24	1076905
Downstream-1 Grab Surface Water	06/09/2019 13:15	1076906
Downstream-2 Grab Surface Water	06/09/2019 14:05	1076907
Disposal Grab Surface Water	06/09/2019 13:10	1076908

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.



## Laboratory Analysis CT QA/QC Certification Form

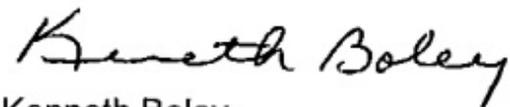
Laboratory Name: Eurofins Lancaster Laboratories Environmental  
 Client: Environmental Services, Inc.  
 Project: 2019-0537  
 Sampling Date(s): 06/09/19  
 Laboratory Sample ID(s): 1076903-1076908

		Yes or No
1	For each analytical method referenced in this laboratory report package, were all specified QA/QC performance criteria followed (including the requirement to explain any criteria falling outside of acceptable guidelines, as specified in the CT DEP method-specific Reasonable Confidence Protocol documents)?	Yes
1A	Were method specified preservation and holding time requirements met?	Yes
1B	<b>VPH and EPH Methods only:</b> Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective methods)?	NA
2	Were all samples received by the laboratory in a condition consistent with that described on the associated chain-of-custody document(s)?	Yes
3	Were samples received at an appropriate temperature (<6° C)?	No
4	Were all QA/QC performance criteria specified in the CT DEP Reasonable Confidence Protocol documents achieved?	No
5	Were reporting limits* specified on the chain-of-custody met?	No
6	For each analytical method referenced in this laboratory report package, were results reported for all constituents identified in the method-specific analyte lists presented in the Reasonable Confidence Protocol documents?	Yes
7	Are project specific QC samples included in this data set?	No

**Note: For all questions to which the response was “No” (with exception of question #7), additional information must be provided in an attached narrative. If the answer to #1, #1A or question #1B is “No”, the data package does not meet the requirements for “Reasonable Confidence.”**

**\*The Limit of Quantitation (LOQ) meets requirements for the Reporting Limit (RL) as defined in the CT Reasonable Confidence Protocols, unless otherwise noted.**

I, the undersigned, attest under the pains and penalties of perjury that the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.



Kenneth Boley  
Senior Specialist, Quality Assurance

Project Name: 2019-0537  
ELLE Group #: 2048083

### General Comments:

See the Laboratory Sample Analysis Record section of the Analysis Report for the method references.

All QC met criteria unless otherwise noted in an Analysis Specific Comment below.

Refer to the QC Summary for specific values and acceptance criteria.

Project specific QC samples are not included in this data set.

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Surrogate recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in an Analysis Specific Comment below.

The samples were received at the appropriate temperature and in accordance with the chain of custody unless otherwise noted.

The sample receipt temperature requirement was not met. The temperature of the temperature blank bottle(s) upon receipt at the lab was 7.3C using a digital thermometer. The sample bottles were then measured using an IR thermometer and were recorded at 7.3-14.1 C.

### Analysis Specific Comments:

#### EPA 537 Version 1.1 Modified, LC/MS/MS Miscellaneous

##### Sample #s: 1076906, 1076907

Perfluorooctanesulfonic acid (PFOS) was detected in the associated method blank as noted on the QC Summary.

The recovery for target analyte PFOS is outside of QC acceptance limits in the laboratory control spike duplicate as noted on the QC Summary.

Reporting limits were raised due to interference from the sample matrix.

##### Sample #s: 1076903, 1076904

Perfluorooctanesulfonic acid (PFOS) was detected in the associated method blank as noted on the QC Summary.

The recovery for target analyte PFOS is outside of QC acceptance limits in the laboratory control spike duplicate as noted on the QC Summary.

The recovery for several extraction standards is outside of QC acceptance limits due to the matrix of the sample.

Reporting limits were raised due to interference from the sample matrix.

##### Sample #s: 1076905, 1076908

Perfluorooctanesulfonic acid (PFOS) was detected in the associated method blank as noted on the QC Summary.

The recovery for target analyte PFOS is outside of QC acceptance

limits in the laboratory control spike duplicate as noted on the QC Summary.

The recovery for several extraction standards is outside of QC acceptance limits due to the matrix of the sample.

The sample injection standard peak areas were outside of the QC limits for both the initial injection and the re-injection. The values here are from the initial injection of the sample.

Reporting limits were raised due to interference from the sample matrix.

Batch #: 19162014 (Sample number(s): 1076903-1076908)

The recovery(ies) for the following analyte(s) in the LCS and/or LCSD exceeded the acceptance window indicating a positive bias: Perfluorooctanesulfonic acid

The relative percent difference(s) for the following analyte(s) in the LCS/LCSD were outside acceptance windows: Perfluorooctanesulfonic acid

The recovery(ies) for one or more surrogates exceeded the acceptance window indicating a positive bias for sample(s) 1076903, 1076905, 1076908

**Sample Description:** Upstream Grab Surface Water  
2019-0537

Environmental Services, Inc.  
ELLE Sample #: WW 1076903  
ELLE Group #: 2048083  
Matrix: Surface Water

**Project Name:** 2019-0537

Submittal Date/Time: 06/11/2019 07:50  
Collection Date/Time: 06/09/2019 11:50

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous		EPA 537 Version 1.1 Modified	ng/l	ng/l	ng/l	
14473	4:2-Fluorotelomersulfonic acid	757124-72-4	N.D.	0.90	2.7	1
14473	6:2-Fluorotelomersulfonic acid	27619-97-2	N.D.	0.90	1.8	1
14473	8:2-Fluorotelomersulfonic acid	39108-34-4	N.D.	1.8	5.4	1
14473	NEtFOSAA	2991-50-6	N.D.	0.90	2.7	1
NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.						
14473	NMeFOSAA	2355-31-9	N.D.	0.90	2.7	1
NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.						
14473	Perfluorobutanesulfonic acid	375-73-5	1.1	0.27	0.90	1
14473	Perfluorobutanoic acid	375-22-4	2.0 J	1.8	5.4	1
14473	Perfluorodecanesulfonic acid	335-77-3	N.D.	0.54	1.8	1
14473	Perfluorodecanoic acid	335-76-2	N.D.	0.81	1.8	1
14473	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.8	1
14473	Perfluoroheptanesulfonic acid	375-92-8	N.D.	0.36	1.8	1
14473	Perfluoroheptanoic acid	375-85-9	0.92	0.36	0.90	1
14473	Perfluorohexanesulfonic acid	355-46-4	1.8	0.36	1.8	1
14473	Perfluorohexanoic acid	307-24-4	2.3	0.36	1.8	1
14473	Perfluorononanesulfonic acid	68259-12-1	N.D.	0.54	1.8	1
14473	Perfluorononanoic acid	375-95-1	0.90 J	0.36	1.8	1
14473	Perfluorooctanesulfonamide	754-91-6	1.2 J	0.45	2.7	1
14473	Perfluorooctanesulfonic acid	1763-23-1	22 B	0.36	1.8	1
14473	Perfluorooctanoic acid	335-67-1	3.0	0.27	0.90	1
14473	Perfluoropentanesulfonate	2706-91-4	N.D.	0.36	1.8	1
14473	Perfluoropentanoic acid	2706-90-3	2.5 J	1.8	5.4	1
14473	Perfluorotetradecanoic acid	376-06-7	N.D.	0.27	0.90	1
14473	Perfluorotridecanoic acid	72629-94-8	N.D.	0.36	0.90	1
14473	Perfluoroundecanoic acid	2058-94-8	N.D.	0.36	1.8	1

Perfluorooctanesulfonic acid (PFOS) was detected in the associated method blank as noted on the QC Summary.

The recovery for target analyte PFOS is outside of QC acceptance limits in the laboratory control spike duplicate as noted on the QC Summary.

The recovery for several extraction standards is outside of QC acceptance limits due to the matrix of the sample.

Reporting limits were raised due to interference from the sample matrix.

### Sample Comments

The sample receipt temperature requirement was not met. The temperature of the temperature blank bottle(s) upon receipt at the lab was 7.3C using a digital thermometer. The sample bottles were then measured using an IR thermometer and were recorded at 7.3-14.1 C.

\*=This limit was used in the evaluation of the final result

**Sample Description:** Upstream Grab Surface Water  
2019-0537

Environmental Services, Inc.  
ELLE Sample #: WW 1076903  
ELLE Group #: 2048083  
Matrix: Surface Water

**Project Name:** 2019-0537

Submittal Date/Time: 06/11/2019 07:50  
Collection Date/Time: 06/09/2019 11:50

### Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	PFAS - 24 compounds	EPA 537 Version 1.1 Modified	1	19162014	06/12/2019 10:43	Devon M Whooley	1
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	19162014	06/11/2019 16:00	Anthony C Polaski	1

\*=This limit was used in the evaluation of the final result

**Sample Description:** Outfall Grab Surface Water  
2019-0537

**Environmental Services, Inc.**  
**ELLE Sample #:** WW 1076904  
**ELLE Group #:** 2048083  
**Matrix:** Surface Water

**Project Name:** 2019-0537

**Submittal Date/Time:** 06/11/2019 07:50  
**Collection Date/Time:** 06/09/2019 12:07

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous		EPA 537 Version 1.1 Modified	ng/l	ng/l	ng/l	
14473	4:2-Fluorotelomersulfonic acid	757124-72-4	N.D.	940	2,800	1000
14473	6:2-Fluorotelomersulfonic acid	27619-97-2	N.D.	940	1,900	1000
14473	8:2-Fluorotelomersulfonic acid	39108-34-4	N.D.	1,900	5,700	1000
14473	NEtFOSAA	2991-50-6	N.D.	940	2,800	1000
NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.						
14473	NMeFOSAA	2355-31-9	N.D.	940	2,800	1000
NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.						
14473	Perfluorobutanesulfonic acid	375-73-5	17,000	280	940	1000
14473	Perfluorobutanoic acid	375-22-4	5,300 J	1,900	5,700	1000
14473	Perfluorodecanesulfonic acid	335-77-3	N.D.	570	1,900	1000
14473	Perfluorodecanoic acid	335-76-2	N.D.	850	1,900	1000
14473	Perfluorododecanoic acid	307-55-1	N.D.	470	1,900	1000
14473	Perfluoroheptanesulfonic acid	375-92-8	17,000	380	1,900	1000
14473	Perfluoroheptanoic acid	375-85-9	4,800	380	940	1000
14473	Perfluorohexanesulfonic acid	355-46-4	110,000	380	1,900	1000
14473	Perfluorohexanoic acid	307-24-4	17,000	380	1,900	1000
14473	Perfluorononanesulfonic acid	68259-12-1	1,000 J	570	1,900	1000
14473	Perfluorononanoic acid	375-95-1	N.D.	380	1,900	1000
14473	Perfluorooctanesulfonamide	754-91-6	N.D.	470	2,800	1000
14473	Perfluorooctanesulfonic acid	1763-23-1	1,300,000 B	3,800	19,000	10000
14473	Perfluorooctanoic acid	335-67-1	19,000	280	940	1000
14473	Perfluoropentanesulfonate	2706-91-4	18,000	380	1,900	1000
14473	Perfluoropentanoic acid	2706-90-3	6,600	1,900	5,700	1000
14473	Perfluorotetradecanoic acid	376-06-7	N.D.	280	940	1000
14473	Perfluorotridecanoic acid	72629-94-8	N.D.	380	940	1000
14473	Perfluoroundecanoic acid	2058-94-8	N.D.	380	1,900	1000

Perfluorooctanesulfonic acid (PFOS) was detected in the associated method blank as noted on the QC Summary.

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Reporting limits were raised due to interference from the sample matrix.

### Sample Comments

The sample receipt temperature requirement was not met. The temperature of the temperature blank bottle(s) upon receipt at the lab was 7.3C using a digital thermometer. The sample bottles were then measured using an IR thermometer and were recorded at 7.3-14.1 C.

\*=This limit was used in the evaluation of the final result

**Sample Description:** Outfall Grab Surface Water  
2019-0537

Environmental Services, Inc.  
**ELLE Sample #:** WW 1076904  
**ELLE Group #:** 2048083  
**Matrix:** Surface Water

**Project Name:** 2019-0537

**Submittal Date/Time:** 06/11/2019 07:50  
**Collection Date/Time:** 06/09/2019 12:07

### Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	PFAS - 24 compounds	EPA 537 Version 1.1 Modified	1	19162014	06/12/2019 11:01	Devon M Whooley	1000
14473	PFAS - 24 compounds	EPA 537 Version 1.1 Modified	1	19162014	06/12/2019 11:56	Devon M Whooley	10000
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	19162014	06/11/2019 16:00	Anthony C Polaski	1

\*=This limit was used in the evaluation of the final result

**Sample Description:** Plant Grab Surface Water  
2019-0537

**Environmental Services, Inc.**  
**ELLE Sample #:** WW 1076905  
**ELLE Group #:** 2048083  
**Matrix:** Surface Water

**Project Name:** 2019-0537

**Submission Date/Time:** 06/11/2019 07:50  
**Collection Date/Time:** 06/09/2019 12:24

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous		EPA 537 Version 1.1 Modified	ng/l	ng/l	ng/l	
14473	4:2-Fluorotelomersulfonic acid	757124-72-4	N.D.	8.7	26	10
14473	6:2-Fluorotelomersulfonic acid	27619-97-2	N.D.	8.7	17	10
14473	8:2-Fluorotelomersulfonic acid	39108-34-4	N.D.	17	52	10
14473	NEtFOSAA	2991-50-6	N.D.	8.7	26	10
NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.						
14473	NMeFOSAA	2355-31-9	N.D.	8.7	26	10
NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.						
14473	Perfluorobutanesulfonic acid	375-73-5	230	2.6	8.7	10
14473	Perfluorobutanoic acid	375-22-4	68	17	52	10
14473	Perfluorodecanesulfonic acid	335-77-3	84	5.2	17	10
14473	Perfluorodecanoic acid	335-76-2	N.D.	7.8	17	10
14473	Perfluorododecanoic acid	307-55-1	N.D.	4.3	17	10
14473	Perfluoroheptanesulfonic acid	375-92-8	970	3.5	17	10
14473	Perfluoroheptanoic acid	375-85-9	82	3.5	8.7	10
14473	Perfluorohexanesulfonic acid	355-46-4	3,100	3.5	17	10
14473	Perfluorohexanoic acid	307-24-4	260	3.5	17	10
14473	Perfluorononanesulfonic acid	68259-12-1	270	5.2	17	10
14473	Perfluorononanoic acid	375-95-1	19	3.5	17	10
14473	Perfluorooctanesulfonamide	754-91-6	5.6 J	4.3	26	10
14473	Perfluorooctanesulfonic acid	1763-23-1	130,000 B	350	1,700	1000
14473	Perfluorooctanoic acid	335-67-1	510	2.6	8.7	10
14473	Perfluoropentanesulfonate	2706-91-4	300	3.5	17	10
14473	Perfluoropentanoic acid	2706-90-3	91	17	52	10
14473	Perfluorotetradecanoic acid	376-06-7	N.D.	2.6	8.7	10
14473	Perfluorotridecanoic acid	72629-94-8	N.D.	3.5	8.7	10
14473	Perfluoroundecanoic acid	2058-94-8	8.3 J	3.5	17	10

Perfluorooctanesulfonic acid (PFOS) was detected in the associated method blank as noted on the QC Summary.

The recovery for target analyte PFOS is outside of QC acceptance limits in the laboratory control spike duplicate as noted on the QC Summary.

The recovery for several extraction standards is outside of QC acceptance limits due to the matrix of the sample.

The sample injection standard peak areas were outside of the QC limits for both the initial injection and the re-injection. The values here are from the initial injection of the sample.

Reporting limits were raised due to interference from the sample matrix.

\*=This limit was used in the evaluation of the final result

**Sample Description:** Plant Grab Surface Water  
2019-0537

Environmental Services, Inc.  
ELLE Sample #: WW 1076905  
ELLE Group #: 2048083  
Matrix: Surface Water

**Project Name:** 2019-0537

Submittal Date/Time: 06/11/2019 07:50  
Collection Date/Time: 06/09/2019 12:24

### Sample Comments

The sample receipt temperature requirement was not met. The temperature of the temperature blank bottle(s) upon receipt at the lab was 7.3C using a digital thermometer. The sample bottles were then measured using an IR thermometer and were recorded at 7.3-14.1 C.

### Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	PFAS - 24 compounds	EPA 537 Version 1.1 Modified	1	19162014	06/12/2019 09:12	Devon M Whooley	10
14473	PFAS - 24 compounds	EPA 537 Version 1.1 Modified	1	19162014	06/12/2019 11:19	Devon M Whooley	1000
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	19162014	06/11/2019 16:00	Anthony C Polaski	1

\*=This limit was used in the evaluation of the final result

**Sample Description:** Downstream-1 Grab Surface Water  
2019-0537

**Environmental Services, Inc.**  
**ELLE Sample #:** WW 1076906  
**ELLE Group #:** 2048083  
**Matrix:** Surface Water

**Project Name:** 2019-0537

**Submission Date/Time:** 06/11/2019 07:50  
**Collection Date/Time:** 06/09/2019 13:15

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous		EPA 537 Version 1.1 Modified	ng/l	ng/l	ng/l	
14473	4:2-Fluorotelomersulfonic acid	757124-72-4	N.D.	8.6	26	10
14473	6:2-Fluorotelomersulfonic acid	27619-97-2	N.D.	8.6	17	10
14473	8:2-Fluorotelomersulfonic acid	39108-34-4	N.D.	17	52	10
14473	NEtFOSAA	2991-50-6	N.D.	8.6	26	10
NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.						
14473	NMeFOSAA	2355-31-9	N.D.	8.6	26	10
NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.						
14473	Perfluorobutanesulfonic acid	375-73-5	190	2.6	8.6	10
14473	Perfluorobutanoic acid	375-22-4	61	17	52	10
14473	Perfluorodecanesulfonic acid	335-77-3	N.D.	5.2	17	10
14473	Perfluorodecanoic acid	335-76-2	N.D.	7.8	17	10
14473	Perfluorododecanoic acid	307-55-1	N.D.	4.3	17	10
14473	Perfluoroheptanesulfonic acid	375-92-8	140	3.5	17	10
14473	Perfluoroheptanoic acid	375-85-9	56	3.5	8.6	10
14473	Perfluorohexanesulfonic acid	355-46-4	1,200	3.5	17	10
14473	Perfluorohexanoic acid	307-24-4	190	3.5	17	10
14473	Perfluorononanesulfonic acid	68259-12-1	9.2 J	5.2	17	10
14473	Perfluorononanoic acid	375-95-1	N.D.	3.5	17	10
14473	Perfluorooctanesulfonamide	754-91-6	N.D.	4.3	26	10
14473	Perfluorooctanesulfonic acid	1763-23-1	11,000 B	35	170	100
14473	Perfluorooctanoic acid	335-67-1	200	2.6	8.6	10
14473	Perfluoropentanesulfonate	2706-91-4	210	3.5	17	10
14473	Perfluoropentanoic acid	2706-90-3	74	17	52	10
14473	Perfluorotetradecanoic acid	376-06-7	N.D.	2.6	8.6	10
14473	Perfluorotridecanoic acid	72629-94-8	N.D.	3.5	8.6	10
14473	Perfluoroundecanoic acid	2058-94-8	N.D.	3.5	17	10

Perfluorooctanesulfonic acid (PFOS) was detected in the associated method blank as noted on the QC Summary.

The recovery for target analyte PFOS is outside of QC acceptance limits in the laboratory control spike duplicate as noted on the QC Summary.

Reporting limits were raised due to interference from the sample matrix.

### Sample Comments

The sample receipt temperature requirement was not met. The temperature of the temperature blank bottle(s) upon receipt at the lab was 7.3C using a digital thermometer. The sample bottles were then measured using an IR thermometer and were recorded at 7.3-14.1 C.

\*=This limit was used in the evaluation of the final result

**Sample Description:** Downstream-1 Grab Surface Water  
2019-0537

Environmental Services, Inc.  
ELLE Sample #: WW 1076906  
ELLE Group #: 2048083  
Matrix: Surface Water

**Project Name:** 2019-0537

Submittal Date/Time: 06/11/2019 07:50  
Collection Date/Time: 06/09/2019 13:15

### Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	PFAS - 24 compounds	EPA 537 Version 1.1 Modified	1	19162014	06/12/2019 09:30	Devon M Whooley	10
14473	PFAS - 24 compounds	EPA 537 Version 1.1 Modified	1	19162014	06/12/2019 09:48	Devon M Whooley	100
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	19162014	06/11/2019 16:00	Anthony C Polaski	1

\*=This limit was used in the evaluation of the final result

**Sample Description:** Downstream-2 Grab Surface Water  
2019-0537

**Environmental Services, Inc.**  
**ELLE Sample #:** WW 1076907  
**ELLE Group #:** 2048083  
**Matrix:** Surface Water

**Project Name:** 2019-0537

**Submission Date/Time:** 06/11/2019 07:50  
**Collection Date/Time:** 06/09/2019 14:05

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous		EPA 537 Version 1.1 Modified	ng/l	ng/l	ng/l	
14473	4:2-Fluorotelomersulfonic acid	757124-72-4	N.D.	9.4	28	10
14473	6:2-Fluorotelomersulfonic acid	27619-97-2	N.D.	9.4	19	10
14473	8:2-Fluorotelomersulfonic acid	39108-34-4	N.D.	19	56	10
14473	NEtFOSAA	2991-50-6	N.D.	9.4	28	10
NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.						
14473	NMeFOSAA	2355-31-9	N.D.	9.4	28	10
NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.						
14473	Perfluorobutanesulfonic acid	375-73-5	170	2.8	9.4	10
14473	Perfluorobutanoic acid	375-22-4	57	19	56	10
14473	Perfluorodecanesulfonic acid	335-77-3	N.D.	5.6	19	10
14473	Perfluorodecanoic acid	335-76-2	N.D.	8.5	19	10
14473	Perfluorododecanoic acid	307-55-1	N.D.	4.7	19	10
14473	Perfluoroheptanesulfonic acid	375-92-8	93	3.8	19	10
14473	Perfluoroheptanoic acid	375-85-9	45	3.8	9.4	10
14473	Perfluorohexanesulfonic acid	355-46-4	1,000	3.8	19	10
14473	Perfluorohexanoic acid	307-24-4	180	3.8	19	10
14473	Perfluorononanesulfonic acid	68259-12-1	11 J	5.6	19	10
14473	Perfluorononanoic acid	375-95-1	N.D.	3.8	19	10
14473	Perfluorooctanesulfonamide	754-91-6	N.D.	4.7	28	10
14473	Perfluorooctanesulfonic acid	1763-23-1	8,300 B	38	190	100
14473	Perfluorooctanoic acid	335-67-1	160	2.8	9.4	10
14473	Perfluoropentanesulfonate	2706-91-4	170	3.8	19	10
14473	Perfluoropentanoic acid	2706-90-3	67	19	56	10
14473	Perfluorotetradecanoic acid	376-06-7	N.D.	2.8	9.4	10
14473	Perfluorotridecanoic acid	72629-94-8	N.D.	3.8	9.4	10
14473	Perfluoroundecanoic acid	2058-94-8	N.D.	3.8	19	10

Perfluorooctanesulfonic acid (PFOS) was detected in the associated method blank as noted on the QC Summary.

The recovery for target analyte PFOS is outside of QC acceptance limits in the laboratory control spike duplicate as noted on the QC Summary.

Reporting limits were raised due to interference from the sample matrix.

### Sample Comments

The sample receipt temperature requirement was not met. The temperature of the temperature blank bottle(s) upon receipt at the lab was 7.3C using a digital thermometer. The sample bottles were then measured using an IR thermometer and were recorded at 7.3-14.1 C.

\*=This limit was used in the evaluation of the final result

**Sample Description:** Downstream-2 Grab Surface Water  
2019-0537

Environmental Services, Inc.  
**ELLE Sample #:** WW 1076907  
**ELLE Group #:** 2048083  
**Matrix:** Surface Water

**Project Name:** 2019-0537

**Submittal Date/Time:** 06/11/2019 07:50  
**Collection Date/Time:** 06/09/2019 14:05

### Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	PFAS - 24 compounds	EPA 537 Version 1.1 Modified	1	19162014	06/12/2019 09:57	Devon M Whooley	10
14473	PFAS - 24 compounds	EPA 537 Version 1.1 Modified	1	19162014	06/12/2019 10:06	Devon M Whooley	100
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	19162014	06/11/2019 16:00	Anthony C Polaski	1

\*=This limit was used in the evaluation of the final result

**Sample Description:** Disposal Grab Surface Water  
2019-0537

**Environmental Services, Inc.**  
**ELLE Sample #:** WW 1076908  
**ELLE Group #:** 2048083  
**Matrix:** Surface Water

**Project Name:** 2019-0537

**Submission Date/Time:** 06/11/2019 07:50  
**Collection Date/Time:** 06/09/2019 13:10

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous		EPA 537 Version 1.1 Modified	ng/l	ng/l	ng/l	
14473	4:2-Fluorotelomersulfonic acid	757124-72-4	N.D.	250	750	100
14473	6:2-Fluorotelomersulfonic acid	27619-97-2	N.D.	250	500	100
14473	8:2-Fluorotelomersulfonic acid	39108-34-4	N.D.	500	1,500	100
14473	NEtFOSAA	2991-50-6	N.D.	250	750	100
NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.						
14473	NMeFOSAA	2355-31-9	N.D.	250	750	100
NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.						
14473	Perfluorobutanesulfonic acid	375-73-5	100,000	7,500	25,000	10000
14473	Perfluorobutanoic acid	375-22-4	26,000	500	1,500	100
14473	Perfluorodecanesulfonic acid	335-77-3	530	150	500	100
14473	Perfluorodecanoic acid	335-76-2	N.D.	220	500	100
14473	Perfluorododecanoic acid	307-55-1	N.D.	120	500	100
14473	Perfluoroheptanesulfonic acid	375-92-8	250,000	10,000	50,000	10000
14473	Perfluoroheptanoic acid	375-85-9	35,000	100	250	100
14473	Perfluorohexanesulfonic acid	355-46-4	1,400,000	10,000	50,000	10000
14473	Perfluorohexanoic acid	307-24-4	100,000	10,000	50,000	10000
14473	Perfluorononanesulfonic acid	68259-12-1	1,600	150	500	100
14473	Perfluorononanoic acid	375-95-1	700	100	500	100
14473	Perfluorooctanesulfonamide	754-91-6	N.D.	120	750	100
14473	Perfluorooctanesulfonic acid	1763-23-1	7,300,000 B	10,000	50,000	10000
14473	Perfluorooctanoic acid	335-67-1	260,000	7,500	25,000	10000
14473	Perfluoropentanesulfonate	2706-91-4	120,000	10,000	50,000	10000
14473	Perfluoropentanoic acid	2706-90-3	37,000	500	1,500	100
14473	Perfluorotetradecanoic acid	376-06-7	N.D.	75	250	100
14473	Perfluorotridecanoic acid	72629-94-8	N.D.	100	250	100
14473	Perfluoroundecanoic acid	2058-94-8	N.D.	100	500	100

Perfluorooctanesulfonic acid (PFOS) was detected in the associated method blank as noted on the QC Summary.

The recovery for target analyte PFOS is outside of QC acceptance limits in the laboratory control spike duplicate as noted on the QC Summary.

The recovery for several extraction standards is outside of QC acceptance limits due to the matrix of the sample.

The sample injection standard peak areas were outside of the QC limits for both the initial injection and the re-injection. The values here are from the initial injection of the sample.

Reporting limits were raised due to interference from the sample matrix.

\*=This limit was used in the evaluation of the final result

**Sample Description:** Disposal Grab Surface Water  
2019-0537

Environmental Services, Inc.  
ELLE Sample #: WW 1076908  
ELLE Group #: 2048083  
Matrix: Surface Water

**Project Name:** 2019-0537

Submittal Date/Time: 06/11/2019 07:50  
Collection Date/Time: 06/09/2019 13:10

### Sample Comments

The sample receipt temperature requirement was not met. The temperature of the temperature blank bottle(s) upon receipt at the lab was 7.3C using a digital thermometer. The sample bottles were then measured using an IR thermometer and were recorded at 7.3-14.1 C.

### Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	PFAS - 24 compounds	EPA 537 Version 1.1 Modified	1	19162014	06/12/2019 10:25	Christine E Dolman	100
14473	PFAS - 24 compounds	EPA 537 Version 1.1 Modified	1	19162014	06/12/2019 11:47	Christine E Dolman	10000
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	19162014	06/11/2019 16:00	Anthony C Polaski	1

\*=This limit was used in the evaluation of the final result

## Quality Control Summary

Client Name: Environmental Services, Inc.  
Reported: 06/12/2019 16:18

Group Number: 2048083

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

### Method Blank

Analysis Name	Result	MDL**	LOQ
	ng/l	ng/l	ng/l
Batch number: 19162014	Sample number(s): 1076903-1076908		
4:2-Fluorotelomersulfonic acid	N.D.	1.0	3.0
6:2-Fluorotelomersulfonic acid	N.D.	1.0	2.0
8:2-Fluorotelomersulfonic acid	N.D.	2.0	6.0
NEtFOSAA	N.D.	1.0	3.0
NMeFOSAA	N.D.	1.0	3.0
Perfluorobutanesulfonic acid	N.D.	0.30	1.0
Perfluorobutanoic acid	N.D.	2.0	6.0
Perfluorodecanesulfonic acid	N.D.	0.60	2.0
Perfluorodecanoic acid	N.D.	0.90	2.0
Perfluorododecanoic acid	N.D.	0.50	2.0
Perfluoroheptanesulfonic acid	N.D.	0.40	2.0
Perfluoroheptanoic acid	N.D.	0.40	1.0
Perfluorohexanesulfonic acid	N.D.	0.40	2.0
Perfluorohexanoic acid	N.D.	0.40	2.0
Perfluorononanesulfonic acid	N.D.	0.60	2.0
Perfluorononanoic acid	N.D.	0.40	2.0
Perfluorooctanesulfonamide	N.D.	0.50	3.0
Perfluorooctanesulfonic acid	2.2	0.40	2.0
Perfluorooctanoic acid	N.D.	0.30	1.0
Perfluoropentanesulfonate	N.D.	0.40	2.0
Perfluoropentanoic acid	N.D.	2.0	6.0
Perfluorotetradecanoic acid	N.D.	0.30	1.0
Perfluorotridecanoic acid	N.D.	0.40	1.0
Perfluoroundecanoic acid	N.D.	0.40	2.0

### LCS/LCSD

Analysis Name	LCS Spike Added	LCS Conc	LCSD Spike Added	LCSD Conc	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
	ng/l	ng/l	ng/l	ng/l					
Batch number: 19162014	Sample number(s): 1076903-1076908								
4:2-Fluorotelomersulfonic acid	14.94	13.67	14.94	14.78	91	99	82-152	8	30
6:2-Fluorotelomersulfonic acid	15.17	14.67	15.17	15.56	97	103	66-155	6	30
8:2-Fluorotelomersulfonic acid	15.33	15.48	15.33	16.9	101	110	66-148	9	30
NEtFOSAA	5.44	5.78	5.44	6.40	106	118	55-169	10	30
NMeFOSAA	5.44	6.44	5.44	5.92	118	109	44-147	8	30

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: Environmental Services, Inc.  
Reported: 06/12/2019 16:18

Group Number: 2048083

### LCS/LCSD (continued)

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Perfluorobutanesulfonic acid	4.81	5.33	4.81	5.24	111	109	73-128	2	30
Perfluorobutanoic acid	5.44	6.83	5.44	6.51	126	120	74-142	5	30
Perfluorodecanesulfonic acid	5.24	5.72	5.24	6.09	109	116	60-135	6	30
Perfluorodecanoic acid	5.44	6.00	5.44	5.67	110	104	69-148	6	30
Perfluorododecanoic acid	5.44	6.07	5.44	6.44	112	118	75-136	6	30
Perfluoroheptanesulfonic acid	5.18	5.60	5.18	6.46	108	125	64-135	14	30
Perfluoroheptanoic acid	5.44	6.51	5.44	6.56	120	121	76-140	1	30
Perfluorohexanesulfonic acid	5.14	5.17	5.14	5.88	100	114	71-131	13	30
Perfluorohexanoic acid	5.44	6.53	5.44	6.49	120	119	75-135	1	30
Perfluorononanesulfonic acid	5.22	6.01	5.22	6.28	115	120	66-133	4	30
Perfluorononanoic acid	5.44	7.15	5.44	6.52	131	120	72-148	9	30
Perfluorooctanesulfonamide	5.44	5.71	5.44	5.66	105	104	65-164	1	30
Perfluorooctanesulfonic acid	5.20	6.00	5.20	9.54	115	183*	67-138	46*	30
Perfluorooctanoic acid	5.44	5.99	5.44	6.63	110	122	72-138	10	30
Perfluoropentanesulfonate	5.10	5.74	5.10	5.80	113	114	76-127	1	30
Perfluoropentanoic acid	5.44	6.46	5.44	5.99	119	110	74-134	8	30
Perfluorotetradecanoic acid	5.44	6.20	5.44	5.20	114	96	74-135	18	30
Perfluorotridecanoic acid	5.44	5.49	5.44	5.68	101	104	61-145	3	30
Perfluoroundecanoic acid	5.44	6.01	5.44	6.18	111	114	75-146	3	30

### Labeled Isotope Quality Control

Labeled isotope recoveries which are outside of the QC window are confirmed unless otherwise noted on the analysis report.

Analysis Name: PFAS - 24 compounds  
Batch number: 19162014

	13C4-PFBA	13C5-PFPeA	13C3-PFBS	13C2-4:2-FTS	13C5-PFHxA	13C3-PFHxS
1076903	83	106	139	248*	75	58
1076904	90	90	89	115	89	89
1076905	95	80	99	399*	98	95
1076906	96	98	99	154	95	94
1076907	94	98	101	151	95	100
1076908	96	85	81	455*	115	57
Blank	82	86	80	105	82	85
LCS	86	86	86	122	89	92
LCSD	84	85	84	115	85	82
Limits:	33-123	31-157	26-148	21-182	35-138	34-126

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: Environmental Services, Inc.  
Reported: 06/12/2019 16:18

Group Number: 2048083

### Labeled Isotope Quality Control (continued)

Labeled isotope recoveries which are outside of the QC window are confirmed unless otherwise noted on the analysis report.

Analysis Name: PFAS - 24 compounds  
Batch number: 19162014

	13C4-PFHpA	13C2-6:2-FTS	13C8-PFOA	13C8-PFOS	13C9-PFNA	13C6-PFDA
1076903	40	183*	78	79	83	75
1076904	85	120	90	93	99	97
1076905	84	266*	92	214*	157*	96
1076906	85	133	92	101	105	98
1076907	94	132	98	96	94	99
1076908	70	179*	96	382*	166*	96
Blank	72	113	82	84	79	90
LCS	81	123	93	88	84	84
LCSD	72	108	86	80	79	87
Limits:	35-126	32-170	48-122	50-121	41-144	47-125

	13C2-8:2-FTS	d3-NMeFOSAA	13C7-PFUnDA	d5-NEIFOSAA	13C2-PFDoDA	13C2-PFTeDA
1076903	123	91	67	96	65	51
1076904	112	112	96	118	98	97
1076905	201*	111	88	91	60	85
1076906	107	119	89	107	94	86
1076907	107	110	94	115	89	109
1076908	210*	131*	93	128	99	107
Blank	100	99	76	96	84	84
LCS	96	91	75	93	87	81
LCSD	93	98	78	90	84	91
Limits:	27-164	30-127	30-128	30-142	39-130	26-119

	13C8-PFOSA
1076903	45
1076904	95
1076905	69
1076906	89
1076907	96
1076908	86
Blank	75
LCS	71
LCSD	75
Limits:	11-127

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

# Environmental Analysis Request/Chain of Custody



Lancaster Laboratories Environmental

44484 <sup>LF593 6/12/19</sup> For Eurofins Lancaster Laboratories Environmental use only  
 Acct. # ~~14578~~ Group # 2048083 Sample # 1076903-08

COC # 545002

Client Information				Matrix			Analysis Requested										For Lab Use Only			
Client: Environmental Services, Inc		Acct. #:		<input type="checkbox"/> Soil <input type="checkbox"/> Sediment <input type="checkbox"/> Tissue <input type="checkbox"/> Potable <input type="checkbox"/> Ground <input checked="" type="checkbox"/> Surface <input type="checkbox"/> Water <input type="checkbox"/> NPDES <input type="checkbox"/> Other:			Preservation Codes										FSC: _____			
Project Name/ #: 2019-0537		PWSID #:					PFOs + PFOA (PFA) 0 24 PFAS compounds 537 modified as discussed w/ C. Knight LF593 6/11/19										SCR#: _____			
Project Manager: DUSTIN Mitchell		P.O. #: 79197															Preservation Codes		H=HCl T=Thiosulfate	
Sampler: C. Knight		Quote #:															N=NHO <sub>3</sub> B=NaOH		S=H <sub>2</sub> SO <sub>4</sub> O=Other	
State where samples were collected: CT		For Compliance: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		Total # of Containers			Remarks O=other is Trizma													
Sample Identification		Collected		Grab	Composite	Total # of Containers														
Date	Time																			
Upstream	6-9-19 11:50am	X			Surface	2	X													
Outfall	↓ 12:07pm				↓	↓	↓													
Plant	↓ 12:24pm				↓	↓	↓													
Downstream-1	↓ 1:15pm				↓	↓	↓													
Downstream-2	↓ 2:05pm				↓	↓	↓													
Disposal	↓ 1:10pm				↓	↓	↓													

<b>Turnaround Time (TAT) Requested</b> (please circle) Standard _____ <b>Rush</b> _____ (Rush TAT is subject to laboratory approval and surcharge.)	Relinquished by: <i>C. Knight</i>	Date: 6-10-19	Time: 7:30am	Received by:	Date:	Time:
	<del>_____</del>					
Date results are needed: <u>ASAP</u> E-mail address: <u>dustin@e-s-i.com and C.Knight@e-s-i.com</u>	Relinquished by:	Date:	Time:	Received by:	Date:	Time:
	<del>_____</del>					
<b>Data Package Options</b> (circle if required) Type I (EPA Level 3 Equivalent/non-CLP) Type VI (Raw Data Only) Type III (Reduced non-CLP) NJ DKQP TX TRRP-13 NYSDEC Category A or B MA MCP <b>CT RCP</b>	Relinquished by:	Date:	Time:	Received by: <i>mr</i>	Date: 6/11/19	Time: 0750
	<del>_____</del>					
EDD Required? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If yes, format: <u>PDF</u>				Relinquished by Commercial Carrier: UPS _____ FedEx <input checked="" type="checkbox"/> Other _____		
Site-Specific QC (MS/MSD/Dup)? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (If yes, indicate QC sample and submit triplicate sample volume.)				Temperature upon receipt <u>7.3</u> °C		



Client: Environmental Services, Inc.

2019-0537

2048083

**Delivery and Receipt Information**

Delivery Method: Fed Ex Arrival Timestamp: 06/11/2019 7:50  
 Number of Packages: 1 Number of Projects: 1  
 State/Province of Origin: CT

**Arrival Condition Summary**

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	No	Sample Date/Times match COC:	Yes
Samples Chilled:	Yes	VOA Vial Headspace $\geq$ 6mm:	N/A
Paperwork Enclosed:	Yes	Total Trip Blank Qty:	0
Samples Intact:	Yes	Air Quality Samples Present:	No
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Nicole Reiff (25684) at 08:24 on 06/11/2019

**Samples Chilled Details: 2019-0537**

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?	Samples Collected Same Day as Receipt?
1	DT146	7.3	DT	Ice Pack	N	N/A	Y	N

**Elevated Temperature Details: 2019-0537**

All Temperatures in °C

Cooler #	Thermometer ID	Top Left Temp	Top Right Temp	Bottom Left Temp	Bottom Right Temp	Center Temp	Factors Contributing to Elevated Temp	Comments
1	32170023	10.2	14.1	8.0	14.7	14.7	Icepacks on top of samples were not frozen.	

OK to proceed per C. Knight,  
LF593 6/11/19

# Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

<b>BMQL</b>	Below Minimum Quantitation Level	<b>mL</b>	milliliter(s)
<b>C</b>	degrees Celsius	<b>MPN</b>	Most Probable Number
<b>cfu</b>	colony forming units	<b>N.D.</b>	non-detect
<b>CP Units</b>	cobalt-chloroplatinate units	<b>ng</b>	nanogram(s)
<b>F</b>	degrees Fahrenheit	<b>NTU</b>	nephelometric turbidity units
<b>g</b>	gram(s)	<b>pg/L</b>	picogram/liter
<b>IU</b>	International Units	<b>RL</b>	Reporting Limit
<b>kg</b>	kilogram(s)	<b>TNTC</b>	Too Numerous To Count
<b>L</b>	liter(s)	<b>µg</b>	microgram(s)
<b>lb.</b>	pound(s)	<b>µL</b>	microliter(s)
<b>m3</b>	cubic meter(s)	<b>umhos/cm</b>	micromhos/cm
<b>meq</b>	milliequivalents	<b>MCL</b>	Maximum Contamination Limit
<b>mg</b>	milligram(s)		
<b>&lt;</b>	less than		
<b>&gt;</b>	greater than		
<b>ppm</b>	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.		
<b>ppb</b>	parts per billion		
<b>Dry weight basis</b>	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.		

**Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.**

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

**WARRANTY AND LIMITS OF LIABILITY** - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

# Data Qualifiers

Qualifier	Definition
C	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
K1	Initial Calibration Blank is above the QC limit and the sample result is ND
K2	Continuing Calibration Blank is above the QC limit and the sample result is ND
K3	Initial Calibration Verification is above the QC limit and the sample result is ND
K4	Continuing Calibration Verification is above the QC limit and the sample result is ND
J (or G, I, X)	Estimated value $\geq$ the Method Detection Limit (MDL or DL) and $<$ the Limit of Quantitation (LOQ or RL)
P	Concentration difference between the primary and confirmation column $>40\%$ . The lower result is reported.
P^	Concentration difference between the primary and confirmation column $> 40\%$ . The higher result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column $>100\%$ . The reporting limit is raised due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods. Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.



## ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental  
2425 New Holland Pike  
Lancaster, PA 17601

Prepared for:

Environmental Services, Inc.  
90 Brookfield Street  
South Windsor CT 06074

Report Date: June 13, 2019 19:19

**Project: 2019-0537**

Account #: 44484  
Group Number: 2048277  
PO Number: 79207  
State of Sample Origin: CT

Electronic Copy To Environmental Services Inc.  
Electronic Copy To Environmental Services Inc.

Attn: Dustin Mitchell  
Attn: Cindy Knight

Respectfully Submitted,



Lynn M. Frederiksen  
Principal Specialist Group Leader

(717) 556-7255

To view our laboratory's current scopes of accreditation please go to <https://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/certifications-and-accreditations-eurofins-lancaster-laboratories-environmental/>. Historical copies may be requested through your project manager.



### SAMPLE INFORMATION

Client Sample Description

Sample Collection  
Date/Time

ELLE#

Signature Grab Foam

06/10/2019 04:20

1077619

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.



## Laboratory Analysis CT QA/QC Certification Form

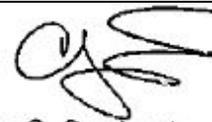
Laboratory Name: Eurofins Lancaster Laboratories Environmental  
 Client: Environmental Services, Inc.  
 Project: 2019-0537  
 Sampling Date(s): 06/10/19  
 Laboratory Sample ID(s): Sample number(s): 1077619

		Yes or No
1	For each analytical method referenced in this laboratory report package, were all specified QA/QC performance criteria followed (including the requirement to explain any criteria falling outside of acceptable guidelines, as specified in the CT DEP method-specific Reasonable Confidence Protocol documents)?	Yes
1A	Were method specified preservation and holding time requirements met?	Yes
1B	<b>VPH and EPH Methods only:</b> Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective methods)?	NA
2	Were all samples received by the laboratory in a condition consistent with that described on the associated chain-of-custody document(s)?	Yes
3	Were samples received at an appropriate temperature (<6° C)?	No
4	Were all QA/QC performance criteria specified in the CT DEP Reasonable Confidence Protocol documents achieved?	No
5	Were reporting limits* specified on the chain-of-custody met?	No
6	For each analytical method referenced in this laboratory report package, were results reported for all constituents identified in the method-specific analyte lists presented in the Reasonable Confidence Protocol documents?	Yes
7	Are project specific QC samples included in this data set?	No

**Note: For all questions to which the response was “No” (with exception of question #7), additional information must be provided in an attached narrative. If the answer to #1, #1A or question #1B is “No”, the data package does not meet the requirements for “Reasonable Confidence.”**

**\*The Limit of Quantitation (LOQ) meets requirements for the Reporting Limit (RL) as defined in the CT Reasonable Confidence Protocols, unless otherwise noted.**

I, the undersigned, attest under the pains and penalties of perjury that the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.



Christiane S. Sweigart  
Senior Specialist

Project Name: 2019-0537  
ELLE Group #: 2048277

**General Comments:**

See the Laboratory Sample Analysis Record section of the Analysis Report for the method references.

All QC met criteria unless otherwise noted in an Analysis Specific Comment below.

Refer to the QC Summary for specific values and acceptance criteria.

Project specific QC samples are not included in this data set.

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Surrogate recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in an Analysis Specific Comment below.

The samples were received at the appropriate temperature and in accordance with the chain of custody unless otherwise noted.

The sample receipt temperature requirement was not met. The temperature of the sample bottle(s) upon receipt at the lab was 16.2 - 17.0 C using an IR thermometer.

**Analysis Specific Comments:****EPA 537 Version 1.1 Modified, LC/MS/MS Miscellaneous****Sample #s: 1077619**

Reporting limits were raised due to interference from the sample matrix.

The sample injection internal standard peak areas were outside of the QC limits for both the initial injection and the re-injection. The values here are from the initial injection of the sample.

The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary.

Target analytes were detected in the method blank as noted on the QC Summary.

**Batch #: 19163008 (Sample number(s): 1077619)**

The recovery(ies) for the following analyte(s) in the LCS and/or LCSD exceeded the acceptance window indicating a positive bias: Perfluorooctanesulfonic acid, Perfluorobutanoic acid

**Sample Description:** Signature Grab Foam  
2019-0537

**Environmental Services, Inc.**  
**ELLE Sample #:** G5 1077619  
**ELLE Group #:** 2048277  
**Matrix:** Foam

**Project Name:** 2019-0537

**Submittal Date/Time:** 06/12/2019 08:15  
**Collection Date/Time:** 06/10/2019 04:20

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous EPA 537 Version 1.1 Modified			ng/l	ng/l	ng/l	
14473	4:2-Fluorotelomersulfonic acid	757124-72-4	N.D.	500,000	1,500,000	1000
14473	6:2-Fluorotelomersulfonic acid	27619-97-2	N.D.	500,000	1,000,000	1000
14473	8:2-Fluorotelomersulfonic acid	39108-34-4	N.D.	1,000,000	3,000,000	1000
14473	NEtFOSAA	2991-50-6	N.D.	500,000	1,500,000	1000
NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.						
14473	NMeFOSAA	2355-31-9	N.D.	500,000	1,500,000	1000
NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.						
14473	Perfluorobutanesulfonic acid	375-73-5	37,000,000	150,000	500,000	1000
14473	Perfluorobutanoic acid	375-22-4	N.D.	1,000,000	3,000,000	1000
14473	Perfluorodecanesulfonic acid	335-77-3	2,600,000	300,000	1,000,000	1000
14473	Perfluorodecanoic acid	335-76-2	N.D.	450,000	1,000,000	1000
14473	Perfluorododecanoic acid	307-55-1	N.D.	250,000	1,000,000	1000
14473	Perfluoroheptanesulfonic acid	375-92-8	53,000,000	200,000	1,000,000	1000
14473	Perfluoroheptanoic acid	375-85-9	14,000,000	200,000	500,000	1000
14473	Perfluorohexanesulfonic acid	355-46-4	310,000,000	2,000,000	10,000,000	10000
14473	Perfluorohexanoic acid	307-24-4	26,000,000	200,000	1,000,000	1000
14473	Perfluorononanesulfonic acid	68259-12-1	6,700,000	300,000	1,000,000	1000
14473	Perfluorononanoic acid	375-95-1	N.D.	200,000	1,000,000	1000
14473	Perfluorooctanesulfonamide	754-91-6	300,000 J	250,000	1,500,000	1000
14473	Perfluorooctanesulfonic acid	1763-23-1	2,400,000,000 B	20,000,000	100,000,000	100000
14473	Perfluorooctanoic acid	335-67-1	62,000,000	150,000	500,000	1000
14473	Perfluoropentanesulfonate	2706-91-4	56,000,000	200,000	1,000,000	1000
14473	Perfluoropentanoic acid	2706-90-3	1,800,000 J	1,000,000	3,000,000	1000
14473	Perfluorotetradecanoic acid	376-06-7	N.D.	150,000	500,000	1000
14473	Perfluorotridecanoic acid	72629-94-8	N.D.	200,000	500,000	1000
14473	Perfluoroundecanoic acid	2058-94-8	N.D.	200,000	1,000,000	1000

Reporting limits were raised due to interference from the sample matrix.

The sample injection internal standard peak areas were outside of the QC limits for both the initial injection and the re-injection. The values here are from the initial injection of the sample.

The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary.

Target analytes were detected in the method blank as noted on the QC Summary.

### Sample Comments

The sample receipt temperature requirement was not met. The temperature of the sample bottle(s) upon receipt at the lab was 16.2 - 17.0 C using an IR thermometer.

\*=This limit was used in the evaluation of the final result

**Sample Description:** Signature Grab Foam  
2019-0537

Environmental Services, Inc.  
**ELLE Sample #:** G5 1077619  
**ELLE Group #:** 2048277  
**Matrix:** Foam

**Project Name:** 2019-0537

Submittal Date/Time: 06/12/2019 08:15  
 Collection Date/Time: 06/10/2019 04:20

### Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	PFAS - 24 compounds	EPA 537 Version 1.1 Modified	1	19163008	06/13/2019 14:33	Marissa C Drexinger	1000
14473	PFAS - 24 compounds	EPA 537 Version 1.1 Modified	1	19163008	06/13/2019 14:42	Marissa C Drexinger	10000
14473	PFAS - 24 compounds	EPA 537 Version 1.1 Modified	1	19163008	06/13/2019 15:45	Marissa C Drexinger	100000
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	19163008	06/12/2019 11:00	Robert Brown	1

\*=This limit was used in the evaluation of the final result

## Quality Control Summary

Client Name: Environmental Services, Inc.  
Reported: 06/13/2019 19:19

Group Number: 2048277

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

### Method Blank

Analysis Name	Result	MDL**	LOQ
	ng/l	ng/l	ng/l
Batch number: 19163008	Sample number(s): 1077619		
4:2-Fluorotelomersulfonic acid	N.D.	500	1,500
6:2-Fluorotelomersulfonic acid	650 J	500	1,000
8:2-Fluorotelomersulfonic acid	N.D.	1,000	3,000
NEtFOSAA	N.D.	500	1,500
NMeFOSAA	N.D.	500	1,500
Perfluorobutanesulfonic acid	N.D.	150	500
Perfluorobutanoic acid	N.D.	1,000	3,000
Perfluorodecanesulfonic acid	N.D.	300	1,000
Perfluorodecanoic acid	N.D.	450	1,000
Perfluorododecanoic acid	N.D.	250	1,000
Perfluoroheptanesulfonic acid	N.D.	200	1,000
Perfluoroheptanoic acid	N.D.	200	500
Perfluorohexanesulfonic acid	N.D.	200	1,000
Perfluorohexanoic acid	N.D.	200	1,000
Perfluorononanesulfonic acid	N.D.	300	1,000
Perfluorononanoic acid	N.D.	200	1,000
Perfluorooctanesulfonamide	N.D.	250	1,500
Perfluorooctanesulfonic acid	430 J	200	1,000
Perfluorooctanoic acid	N.D.	150	500
Perfluoropentanesulfonate	N.D.	200	1,000
Perfluoropentanoic acid	N.D.	1,000	3,000
Perfluorotetradecanoic acid	N.D.	150	500
Perfluorotridecanoic acid	N.D.	200	500
Perfluoroundecanoic acid	N.D.	200	1,000

### LCS/LCSD

Analysis Name	LCS Spike Added	LCS Conc	LCSD Spike Added	LCSD Conc	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
	ng/l	ng/l	ng/l	ng/l					
Batch number: 19163008	Sample number(s): 1077619								
4:2-Fluorotelomersulfonic acid	3736	3591.31	3736	3471.17	96	93	82-152	3	30
6:2-Fluorotelomersulfonic acid	3792	4678.24	3792	4360.38	123	115	66-155	7	30
8:2-Fluorotelomersulfonic acid	3832	3797.45	3832	4615.03	99	120	66-148	19	30
NEtFOSAA	1360	1413.28	1360	1401.26	104	103	55-169	1	30
NMeFOSAA	1360	1346.71	1360	1414.41	99	104	44-147	5	30

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: Environmental Services, Inc.  
Reported: 06/13/2019 19:19

Group Number: 2048277

### LCS/LCSD (continued)

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Perfluorobutanesulfonic acid	1204	1430.64	1204	1326.42	119	110	73-128	8	30
Perfluorobutanoic acid	1360	2273.16	1360	2379.08	167*	175*	74-142	5	30
Perfluorodecanesulfonic acid	1310	1112.36	1310	1170.08	85	89	60-135	5	30
Perfluorodecanoic acid	1360	1491.81	1360	1547.26	110	114	69-148	4	30
Perfluorododecanoic acid	1360	1693.39	1360	1573.2	125	116	75-136	7	30
Perfluoroheptanesulfonic acid	1294	1366.43	1294	1428.75	106	110	64-135	4	30
Perfluoroheptanoic acid	1360	1536.72	1360	1397.29	113	103	76-140	10	30
Perfluorohexanesulfonic acid	1286	1289.57	1286	1475.44	100	115	71-131	13	30
Perfluorohexanoic acid	1360	1563.01	1360	1658.34	115	122	75-135	6	30
Perfluorononanesulfonic acid	1306	1395.35	1306	1281.76	107	98	66-133	8	30
Perfluorononanoic acid	1360	1790.86	1360	1629.2	132	120	72-148	9	30
Perfluorooctanesulfonamide	1360	1385.99	1360	1337.95	102	98	65-164	4	30
Perfluorooctanesulfonic acid	1300	1432.93	1300	1894.37	110	146*	67-138	28	30
Perfluorooctanoic acid	1360	1633.1	1360	1557.79	120	115	72-138	5	30
Perfluoropentanesulfonate	1276	1519.17	1276	1414.33	119	111	76-127	7	30
Perfluoropentanoic acid	1360	1642.72	1360	1593.53	121	117	74-134	3	30
Perfluorotetradecanoic acid	1360	1343.31	1360	1264.37	99	93	74-135	6	30
Perfluorotridecanoic acid	1360	1621.46	1360	1292.82	119	95	61-145	23	30
Perfluoroundecanoic acid	1360	1528.65	1360	1397.1	112	103	75-146	9	30

### Labeled Isotope Quality Control

Labeled isotope recoveries which are outside of the QC window are confirmed unless otherwise noted on the analysis report.

Analysis Name: PFAS - 24 compounds  
Batch number: 19163008

	13C4-PFBA	13C5-PFPeA	13C3-PFBS	13C2-4:2-FTS	13C5-PFHxA	13C3-PFHxS
1077619	82	82	74	101	74	61
Blank	75	78	76	97	77	79
LCS	82	81	77	95	78	87
LCSD	78	73	73	100	76	86
Limits:	33-123	31-157	26-148	21-182	35-138	34-126
	13C4-PFHpA	13C2-6:2-FTS	13C8-PFOA	13C8-PFOS	13C9-PFNA	13C6-PFDA
1077619	64	118	75	116	114	83
Blank	78	95	77	71	75	78
LCS	84	90	79	77	79	77
LCSD	86	100	79	77	74	75

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: Environmental Services, Inc.  
Reported: 06/13/2019 19:19

Group Number: 2048277

### Labeled Isotope Quality Control (continued)

Labeled isotope recoveries which are outside of the QC window are confirmed unless otherwise noted on the analysis report.

Analysis Name: PFAS - 24 compounds  
Batch number: 19163008

Limits:	35-126	32-170	48-122	50-121	41-144	47-125
	13C2-8:2-FTS	d3-NMeFOSAA	13C7-PFUnDA	d5-NEtFOSAA	13C2-PFDoDA	13C2-PFTeDA
1077619	118	106	79	107	78	79
Blank	80	86	73	86	73	72
LCS	84	92	72	89	72	70
LCSD	74	95	74	80	72	64
Limits:	27-164	30-127	30-128	30-142	39-130	26-119
	13C8-PFOSA					
1077619	78					
Blank	74					
LCS	75					
LCSD	72					
Limits:	11-127					

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

# Environmental Analysis Request/Chain of Custody



Lancaster Laboratories  
Environmental

For Eurofins Lancaster Laboratories Environmental use only

Acct. # 14578 Group # 204827 Sample # 1077619

**COC # 545003**

Client Information				Matrix			Analysis Requested						For Lab Use Only																																				
Client: <u>Environmental Services Inc</u>		Acct. #:		<input type="checkbox"/> Tissue <input type="checkbox"/> Ground <input type="checkbox"/> Surface <input type="checkbox"/> Potable <input type="checkbox"/> NPDES <input checked="" type="checkbox"/> Surface <input type="checkbox"/> Sediment <input type="checkbox"/> Soil <input type="checkbox"/> Water <input type="checkbox"/> Other:	Total # of Containers	Preservation Codes						FSC: _____																																					
Project Name/ #: <u>2019-0537</u>		PWSID #:				<table border="1" style="width:100%; height: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%;">0</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td colspan="12" style="text-align: center; vertical-align: middle;">PFOS + PFOA</td> </tr> <tr> <td colspan="12" style="text-align: center;"> </td> </tr> </table>						0												PFOS + PFOA																								SCR#: _____	
0																																																	
PFOS + PFOA																																																	
Project Manager: <u>Dustin Mitchell</u>		P.O. #:		Remarks																																													
Sampler: <u>M. Covensky</u>		Quote #: <u>79207</u>		H=HCl      T=Thiosulfate N=HNO <sub>3</sub> B=NaOH S=H <sub>2</sub> SO <sub>4</sub> O=Other O=Other = Trizma																																													
State where samples were collected: <u>CT</u>		For Compliance: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>																																															
Sample Identification		Collected		Grab	Composite	Analysis Requested						For Lab Use Only																																					
		Date	Time																																														
<u>Signature</u>		<u>6-10-19</u>	<u>4:20</u>	<input checked="" type="checkbox"/>																																													
Turnaround Time (TAT) Requested (please circle)		Relinquished by		Date	Time	Received by		Date	Time	Relinquished by Commercial Carrier:		Temperature upon receipt																																					
Standard		<u>M. Covensky</u>		<u>6/10/19</u>	<u>4:50 pm</u>	<u>Curly JF</u>		<u>6/10/19</u>	<u>4:50 pm</u>	UPS _____ FedEx <input checked="" type="checkbox"/> Other _____		<u>16.2</u> °C																																					
Rush		<u>Curly JF</u>		<u>6/11/19</u>	<u>7:30 am</u>																																												
Date results are needed: <u>ASAP</u>		Relinquished by		Date	Time	Received by		Date	Time																																								
E-mail address: <u>dustin@e-s-i.com and CKnight@e-s-i.com</u>		Relinquished by		Date	Time	Received by		Date	Time																																								
Data Package Options (circle if required)		Relinquished by		Date	Time	Received by		Date	Time																																								
Type I (EPA Level 3 Equivalent/non-CLP)	Type VI (Raw Data Only)	Relinquished by		Date	Time	Received by		Date	Time																																								
Type III (Reduced non-CLP)	NJ DKQP    TX TRRP-13	Relinquished by		Date	Time	Received by		Date	Time																																								
NYSDEC Category A or B	MA MCP <u>CT RCP</u>	Relinquished by		Date	Time	Received by		Date	Time																																								
EDD Required? Yes <input checked="" type="checkbox"/> No		Relinquished by		Date	Time	Received by		Date	Time																																								
If yes, format: <u>PDC</u>		Relinquished by		Date	Time	Received by		Date	Time																																								
Site-Specific QC (MS/MSD/Dup)? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		Relinquished by		Date	Time	Received by		Date	Time																																								
(If yes, indicate QC sample and submit triplicate sample volume.)		Relinquished by		Date	Time	Received by		Date	Time																																								



Client: Environmental Services, Inc.

2019-0537

2048277

**Delivery and Receipt Information**

Delivery Method: Fed Ex Arrival Timestamp: 06/12/2019 8:15  
 Number of Packages: 1 Number of Projects: 1  
 State/Province of Origin: CT

**Arrival Condition Summary**

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	No	Sample Date/Times match COC:	Yes
Samples Chilled:	Yes	VOA Vial Headspace ≥ 6mm:	N/A
Paperwork Enclosed:	Yes	Total Trip Blank Qty:	0
Samples Intact:	Yes	Air Quality Samples Present:	No
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Nicole Reiff (25684) at 09:01 on 06/12/2019

**Samples Chilled Details: 2019-0537**

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?	Samples Collected Same Day as Receipt?
1	32170023	16.2	IR	Ice Pack	N	N/A	Y	N

**Elevated Temperature Details: 2019-0537**

All Temperatures in °C

Cooler #	Thermometer ID	Top Left Temp	Top Right Temp	Bottom Left Temp	Bottom Right Temp	Center Temp	Factors Contributing to Elevated Temp	Comments
1	32170023		17.0		16.8	16.3	Icepacks were warm. Bottles were wrapped in thick layer of bubble wrap.	

OK to proceed per C. Knight

LF593 6/12/19

# Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

<b>BMQL</b>	Below Minimum Quantitation Level	<b>mL</b>	milliliter(s)
<b>C</b>	degrees Celsius	<b>MPN</b>	Most Probable Number
<b>cfu</b>	colony forming units	<b>N.D.</b>	non-detect
<b>CP Units</b>	cobalt-chloroplatinate units	<b>ng</b>	nanogram(s)
<b>F</b>	degrees Fahrenheit	<b>NTU</b>	nephelometric turbidity units
<b>g</b>	gram(s)	<b>pg/L</b>	picogram/liter
<b>IU</b>	International Units	<b>RL</b>	Reporting Limit
<b>kg</b>	kilogram(s)	<b>TNTC</b>	Too Numerous To Count
<b>L</b>	liter(s)	<b>µg</b>	microgram(s)
<b>lb.</b>	pound(s)	<b>µL</b>	microliter(s)
<b>m3</b>	cubic meter(s)	<b>umhos/cm</b>	micromhos/cm
<b>meq</b>	milliequivalents	<b>MCL</b>	Maximum Contamination Limit
<b>mg</b>	milligram(s)		
<b>&lt;</b>	less than		
<b>&gt;</b>	greater than		
<b>ppm</b>	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.		
<b>ppb</b>	parts per billion		
<b>Dry weight basis</b>	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.		

**Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.**

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

**WARRANTY AND LIMITS OF LIABILITY** - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

# Data Qualifiers

Qualifier	Definition
C	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
K1	Initial Calibration Blank is above the QC limit and the sample result is ND
K2	Continuing Calibration Blank is above the QC limit and the sample result is ND
K3	Initial Calibration Verification is above the QC limit and the sample result is ND
K4	Continuing Calibration Verification is above the QC limit and the sample result is ND
J (or G, I, X)	Estimated value $\geq$ the Method Detection Limit (MDL or DL) and $<$ the Limit of Quantitation (LOQ or RL)
P	Concentration difference between the primary and confirmation column $>40\%$ . The lower result is reported.
P^	Concentration difference between the primary and confirmation column $> 40\%$ . The higher result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column $>100\%$ . The reporting limit is raised due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods. Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.



## ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental  
2425 New Holland Pike  
Lancaster, PA 17601

Prepared for:

Environmental Services, Inc.  
90 Brookfield Street  
South Windsor CT 06074

Report Date: June 13, 2019 18:00

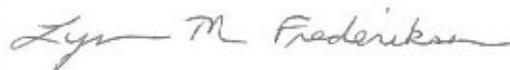
**Project: 2019-0537**

Account #: 44484  
Group Number: 2048283  
PO Number: 79209  
State of Sample Origin: CT

Electronic Copy To Environmental Services Inc.  
Electronic Copy To Environmental Services Inc.

Attn: Dustin Mitchell  
Attn: Cindy Knight

Respectfully Submitted,



Lynn M. Frederiksen  
Principal Specialist Group Leader

(717) 556-7255

To view our laboratory's current scopes of accreditation please go to <https://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/certifications-and-accreditations-eurofins-lancaster-laboratories-environmental/> . Historical copies may be requested through your project manager.



## SAMPLE INFORMATION

Client Sample Description

Sample Collection

ELLE#

Outfall-2 Grab Surface Water

Date/Time

06/11/2019 09:25

1077628

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.



## Laboratory Analysis CT QA/QC Certification Form

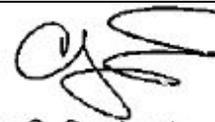
Laboratory Name: Eurofins Lancaster Laboratories Environmental  
 Client: Environmental Services, Inc.  
 Project: 2019-0537  
 Sampling Date(s): 06/11/19  
 Laboratory Sample ID(s): Sample number(s): 1077628

		Yes or No
1	For each analytical method referenced in this laboratory report package, were all specified QA/QC performance criteria followed (including the requirement to explain any criteria falling outside of acceptable guidelines, as specified in the CT DEP method-specific Reasonable Confidence Protocol documents)?	Yes
1A	Were method specified preservation and holding time requirements met?	Yes
1B	<b>VPH and EPH Methods only:</b> Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective methods)?	NA
2	Were all samples received by the laboratory in a condition consistent with that described on the associated chain-of-custody document(s)?	Yes
3	Were samples received at an appropriate temperature (<6° C)?	No
4	Were all QA/QC performance criteria specified in the CT DEP Reasonable Confidence Protocol documents achieved?	No
5	Were reporting limits* specified on the chain-of-custody met?	No
6	For each analytical method referenced in this laboratory report package, were results reported for all constituents identified in the method-specific analyte lists presented in the Reasonable Confidence Protocol documents?	Yes
7	Are project specific QC samples included in this data set?	No

**Note: For all questions to which the response was “No” (with exception of question #7), additional information must be provided in an attached narrative. If the answer to #1, #1A or question #1B is “No”, the data package does not meet the requirements for “Reasonable Confidence.”**

**\*The Limit of Quantitation (LOQ) meets requirements for the Reporting Limit (RL) as defined in the CT Reasonable Confidence Protocols, unless otherwise noted.**

I, the undersigned, attest under the pains and penalties of perjury that the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.



Christiane S. Sweigart  
Senior Specialist

Project Name: 2019-0537  
ELLE Group #: 2048283

**General Comments:**

See the Laboratory Sample Analysis Record section of the Analysis Report for the method references.

All QC met criteria unless otherwise noted in an Analysis Specific Comment below.

Refer to the QC Summary for specific values and acceptance criteria.

Project specific QC samples are not included in this data set.

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Surrogate recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in an Analysis Specific Comment below.

The samples were received at the appropriate temperature and in accordance with the chain of custody unless otherwise noted.

The sample receipt temperature requirement was not met. The temperature of the sample bottle(s) upon receipt at the lab was 16.2 - 17.0 C using an IR thermometer.

**Analysis Specific Comments:****EPA 537 Version 1.1 Modified, LC/MS/MS Miscellaneous****Sample #s: 1077628**

Reporting limits were raised due to interference from the sample matrix.

The sample injection internal standard peak areas were outside of the QC limits for both the initial injection and the re-injection. The values here are from the initial injection of the sample.

The recovery for several extraction standards is outside of QC acceptance limits as noted on the QC Summary, due to the matrix of the sample.

Target analytes were detected in the method blank associated with this sample as noted on the QC Summary.

The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary.

**Batch #: 19163010 (Sample number(s): 1077628)**

The recovery(ies) for the following analyte(s) in the LCS and/or LCSD exceeded the acceptance window indicating a positive bias: Perfluorooctanesulfonic acid

The recovery(ies) for one or more surrogates exceeded the acceptance window indicating a positive bias for sample(s) 1077628

**Sample Description:** Outfall-2 Grab Surface Water  
2019-0537

**Environmental Services, Inc.**  
**ELLE Sample #:** WW 1077628  
**ELLE Group #:** 2048283  
**Matrix:** Surface Water

**Project Name:** 2019-0537

**Submittal Date/Time:** 06/12/2019 08:15  
**Collection Date/Time:** 06/11/2019 09:25

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous		EPA 537 Version 1.1 Modified	ng/l	ng/l	ng/l	
14473	4:2-Fluorotelomersulfonic acid	757124-72-4	N.D.	9.1	27	10
14473	6:2-Fluorotelomersulfonic acid	27619-97-2	N.D.	9.1	18	10
14473	8:2-Fluorotelomersulfonic acid	39108-34-4	N.D.	18	54	10
14473	NEtFOSAA	2991-50-6	48	9.1	27	10
NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.						
14473	NMeFOSAA	2355-31-9	N.D.	9.1	27	10
NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.						
14473	Perfluorobutanesulfonic acid	375-73-5	52	2.7	9.1	10
14473	Perfluorobutanoic acid	375-22-4	18 J	18	54	10
14473	Perfluorodecanesulfonic acid	335-77-3	86	5.4	18	10
14473	Perfluorodecanoic acid	335-76-2	N.D.	8.2	18	10
14473	Perfluorododecanoic acid	307-55-1	N.D.	4.5	18	10
14473	Perfluoroheptanesulfonic acid	375-92-8	220	3.6	18	10
14473	Perfluoroheptanoic acid	375-85-9	17	3.6	9.1	10
14473	Perfluorohexanesulfonic acid	355-46-4	480 B	3.6	18	10
14473	Perfluorohexanoic acid	307-24-4	70	3.6	18	10
14473	Perfluorononanesulfonic acid	68259-12-1	680	5.4	18	10
14473	Perfluorononanoic acid	375-95-1	5.4 J	3.6	18	10
14473	Perfluorooctanesulfonamide	754-91-6	25 J	4.5	27	10
14473	Perfluorooctanesulfonic acid	1763-23-1	89,000 B	360	1,800	1000
14473	Perfluorooctanoic acid	335-67-1	85	2.7	9.1	10
14473	Perfluoropentanesulfonate	2706-91-4	60	3.6	18	10
14473	Perfluoropentanoic acid	2706-90-3	27 J	18	54	10
14473	Perfluorotetradecanoic acid	376-06-7	N.D.	2.7	9.1	10
14473	Perfluorotridecanoic acid	72629-94-8	N.D.	3.6	9.1	10
14473	Perfluoroundecanoic acid	2058-94-8	26	3.6	18	10

Reporting limits were raised due to interference from the sample matrix.

The sample injection internal standard peak areas were outside of the QC limits for both the initial injection and the re-injection. The values here are from the initial injection of the sample.

The recovery for several extraction standards is outside of QC acceptance limits as noted on the QC Summary, due to the matrix of the sample.

Target analytes were detected in the method blank associated with this sample as noted on the QC Summary.

The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary.

\*=This limit was used in the evaluation of the final result

**Sample Description:** Outfall-2 Grab Surface Water  
2019-0537

Environmental Services, Inc.  
ELLE Sample #: WW 1077628  
ELLE Group #: 2048283  
Matrix: Surface Water

**Project Name:** 2019-0537

Submittal Date/Time: 06/12/2019 08:15  
Collection Date/Time: 06/11/2019 09:25

### Sample Comments

The sample receipt temperature requirement was not met. The temperature of the sample bottle(s) upon receipt at the lab was 16.2 - 17.0 C using an IR thermometer.

### Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	PFAS - 24 compounds	EPA 537 Version 1.1 Modified	1	19163010	06/12/2019 21:35	Danielle D McCully	10
14473	PFAS - 24 compounds	EPA 537 Version 1.1 Modified	1	19163010	06/13/2019 15:00	Danielle D McCully	1000
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	19163010	06/12/2019 11:15	Robert Brown	1

\*=This limit was used in the evaluation of the final result

## Quality Control Summary

Client Name: Environmental Services, Inc.  
Reported: 06/13/2019 18:00

Group Number: 2048283

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

### Method Blank

Analysis Name	Result	MDL**	LOQ
	ng/l	ng/l	ng/l
Batch number: 19163010	Sample number(s): 1077628		
4:2-Fluorotelomersulfonic acid	N.D.	1.0	3.0
6:2-Fluorotelomersulfonic acid	N.D.	1.0	2.0
8:2-Fluorotelomersulfonic acid	N.D.	2.0	6.0
NEtFOSAA	N.D.	1.0	3.0
NMeFOSAA	N.D.	1.0	3.0
Perfluorobutanesulfonic acid	N.D.	0.30	1.0
Perfluorobutanoic acid	N.D.	2.0	6.0
Perfluorodecanesulfonic acid	N.D.	0.60	2.0
Perfluorodecanoic acid	N.D.	0.90	2.0
Perfluorododecanoic acid	N.D.	0.50	2.0
Perfluoroheptanesulfonic acid	N.D.	0.40	2.0
Perfluoroheptanoic acid	N.D.	0.40	1.0
Perfluorohexanesulfonic acid	0.44 J	0.40	2.0
Perfluorohexanoic acid	N.D.	0.40	2.0
Perfluorononanesulfonic acid	N.D.	0.60	2.0
Perfluorononanoic acid	N.D.	0.40	2.0
Perfluorooctanesulfonamide	N.D.	0.50	3.0
Perfluorooctanesulfonic acid	3.8	0.40	2.0
Perfluorooctanoic acid	N.D.	0.30	1.0
Perfluoropentanesulfonate	N.D.	0.40	2.0
Perfluoropentanoic acid	N.D.	2.0	6.0
Perfluorotetradecanoic acid	N.D.	0.30	1.0
Perfluorotridecanoic acid	N.D.	0.40	1.0
Perfluoroundecanoic acid	N.D.	0.40	2.0

### LCS/LCSD

Analysis Name	LCS Spike Added	LCS Conc	LCSD Spike Added	LCSD Conc	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
	ng/l	ng/l	ng/l	ng/l					
Batch number: 19163010	Sample number(s): 1077628								
4:2-Fluorotelomersulfonic acid	14.94	12.79	14.94	13.61	86	91	82-152	6	30
6:2-Fluorotelomersulfonic acid	15.17	14	15.17	14.82	92	98	66-155	6	30
8:2-Fluorotelomersulfonic acid	15.33	15.26	15.33	15.15	100	99	66-148	1	30
NEtFOSAA	5.44	5.26	5.44	5.85	97	108	55-169	11	30
NMeFOSAA	5.44	6.36	5.44	6.00	117	110	44-147	6	30

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: Environmental Services, Inc.  
Reported: 06/13/2019 18:00

Group Number: 2048283

### LCS/LCSD (continued)

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Perfluorobutanesulfonic acid	4.81	5.42	4.81	5.26	113	109	73-128	3	30
Perfluorobutanoic acid	5.44	6.62	5.44	6.98	122	128	74-142	5	30
Perfluorodecanesulfonic acid	5.24	4.86	5.24	5.66	93	108	60-135	15	30
Perfluorodecanoic acid	5.44	5.73	5.44	6.10	105	112	69-148	6	30
Perfluorododecanoic acid	5.44	6.00	5.44	6.34	110	116	75-136	5	30
Perfluoroheptanesulfonic acid	5.18	4.98	5.18	5.63	96	109	64-135	12	30
Perfluoroheptanoic acid	5.44	5.95	5.44	6.41	109	118	76-140	7	30
Perfluorohexanesulfonic acid	5.14	5.21	5.14	5.47	101	106	71-131	5	30
Perfluorohexanoic acid	5.44	5.96	5.44	6.05	110	111	75-135	1	30
Perfluorononanesulfonic acid	5.22	5.57	5.22	5.89	107	113	66-133	6	30
Perfluorononanoic acid	5.44	6.41	5.44	6.06	118	111	72-148	6	30
Perfluorooctanesulfonamide	5.44	5.31	5.44	5.81	98	107	65-164	9	30
Perfluorooctanesulfonic acid	5.20	7.73	5.20	6.49	149*	125	67-138	18	30
Perfluorooctanoic acid	5.44	6.13	5.44	6.26	113	115	72-138	2	30
Perfluoropentanesulfonate	5.10	5.48	5.10	5.78	107	113	76-127	5	30
Perfluoropentanoic acid	5.44	6.00	5.44	6.43	110	118	74-134	7	30
Perfluorotetradecanoic acid	5.44	5.48	5.44	5.50	101	101	74-135	0	30
Perfluorotridecanoic acid	5.44	5.92	5.44	6.14	109	113	61-145	4	30
Perfluoroundecanoic acid	5.44	6.52	5.44	6.23	120	115	75-146	4	30

### Labeled Isotope Quality Control

Labeled isotope recoveries which are outside of the QC window are confirmed unless otherwise noted on the analysis report.

Analysis Name: PFAS - 24 compounds  
Batch number: 19163010

	13C4-PFBA	13C5-PFPeA	13C3-PFBS	13C2-4:2-FTS	13C5-PFHxA	13C3-PFHxS
1077628	93	92	95	167	92	94
Blank	78	78	75	93	78	80
LCS	85	85	84	112	86	97
LCSD	74	75	74	93	75	78
Limits:	33-123	31-157	26-148	21-182	35-138	34-126
	13C4-PFHpA	13C2-6:2-FTS	13C8-PFOA	13C8-PFOS	13C9-PFNA	13C6-PFDA
1077628	88	152	87	143*	160*	93
Blank	80	96	75	76	72	80
LCS	88	113	84	85	83	79
LCSD	76	98	76	69	71	80

\*- Outside of specification

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(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

## Quality Control Summary

Client Name: Environmental Services, Inc.  
Reported: 06/13/2019 18:00

Group Number: 2048283

### Labeled Isotope Quality Control (continued)

Labeled isotope recoveries which are outside of the QC window are confirmed unless otherwise noted on the analysis report.

Analysis Name: PFAS - 24 compounds  
Batch number: 19163010

Limits:	35-126	32-170	48-122	50-121	41-144	47-125
	13C2-8:2-FTS	d3-NMeFOSAA	13C7-PFUnDA	d5-NEtFOSAA	13C2-PFDoDA	13C2-PFTeDA
1077628	118	115	92	119	94	102
Blank	90	85	71	84	77	73
LCS	91	87	73	91	76	74
LCSD	94	91	75	91	76	83
Limits:	27-164	30-127	30-128	30-142	39-130	26-119
	13C8-PFOSA					
1077628	86					
Blank	68					
LCS	71					
LCSD	72					
Limits:	11-127					

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.





Group Number(s):  
2048283

Client: Environmental Services, Inc.

2019-0537

**Delivery and Receipt Information**

Delivery Method: Fed Ex      Arrival Timestamp: 06/12/2019 8:15  
 Number of Packages: 1      Number of Projects: 1  
 State/Province of Origin: CT

**Arrival Condition Summary**

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	No	Sample Date/Times match COC:	Yes
Samples Chilled:	Yes	VOA Vial Headspace ≥ 6mm:	N/A
Paperwork Enclosed:	Yes	Total Trip Blank Qty:	0
Samples Intact:	Yes	Air Quality Samples Present:	No
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Nicole Reiff (25684) at 09:01 on 06/12/2019

**Samples Chilled Details: 2019-0537**

Thermometer Types:    DT = Digital (Temp. Bottle)    IR = Infrared (Surface Temp)    All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?	<u>Samples Collected Same Day as Receipt?</u>
1	32170023	16.2	IR	Ice Pack	N	N/A	Y	N

**Elevated Temperature Details: 2019-0537**

All Temperatures in °C

Cooler #	Thermometer ID	Top Left Temp	Top Right Temp	Bottom Left Temp	Bottom Right Temp	Center Temp	Factors Contributing to Elevated Temp	Comments
1	32170023		17.0		16.8	16.3	Icepacks were warm. Bottles were wrapped in thick layer of bubble wrap.	

OK to proceed per C. Knight.  
LFS93 6/12/19

# Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

<b>BMQL</b>	Below Minimum Quantitation Level	<b>mL</b>	milliliter(s)
<b>C</b>	degrees Celsius	<b>MPN</b>	Most Probable Number
<b>cfu</b>	colony forming units	<b>N.D.</b>	non-detect
<b>CP Units</b>	cobalt-chloroplatinate units	<b>ng</b>	nanogram(s)
<b>F</b>	degrees Fahrenheit	<b>NTU</b>	nephelometric turbidity units
<b>g</b>	gram(s)	<b>pg/L</b>	picogram/liter
<b>IU</b>	International Units	<b>RL</b>	Reporting Limit
<b>kg</b>	kilogram(s)	<b>TNTC</b>	Too Numerous To Count
<b>L</b>	liter(s)	<b>µg</b>	microgram(s)
<b>lb.</b>	pound(s)	<b>µL</b>	microliter(s)
<b>m3</b>	cubic meter(s)	<b>umhos/cm</b>	micromhos/cm
<b>meq</b>	milliequivalents	<b>MCL</b>	Maximum Contamination Limit
<b>mg</b>	milligram(s)		
<b>&lt;</b>	less than		
<b>&gt;</b>	greater than		
<b>ppm</b>	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.		
<b>ppb</b>	parts per billion		
<b>Dry weight basis</b>	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.		

**Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.**

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

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# Data Qualifiers

Qualifier	Definition
C	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
K1	Initial Calibration Blank is above the QC limit and the sample result is ND
K2	Continuing Calibration Blank is above the QC limit and the sample result is ND
K3	Initial Calibration Verification is above the QC limit and the sample result is ND
K4	Continuing Calibration Verification is above the QC limit and the sample result is ND
J (or G, I, X)	Estimated value $\geq$ the Method Detection Limit (MDL or DL) and $<$ the Limit of Quantitation (LOQ or RL)
P	Concentration difference between the primary and confirmation column $>40\%$ . The lower result is reported.
P^	Concentration difference between the primary and confirmation column $> 40\%$ . The higher result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column $>100\%$ . The reporting limit is raised due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods. Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.