

## ANALYTICAL REPORT

Job Number: 280-131137-1

Job Description: ADEM PFC Sampling - Gadsden

For:

Alabama Dept. Environmental Management  
2715 Sandlin Road, SW  
Decatur, AL 35603

Attention: Mr. Bruce Freeman



Approved for release.  
Betsy A Sara  
Project Manager II  
12/3/2019 11:05 AM

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12/03/2019

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The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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## Definitions/Glossary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Gadsden

Job ID: 280-131137-1

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### Qualifiers

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#### LCMS

Qualifier	Qualifier Description
I	Value is EMPC (estimated maximum possible concentration).
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U	Indicates the analyte was analyzed for but not detected.

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### Glossary

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Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

## CASE NARRATIVE

Client: Alabama Dept. Environmental Management

Project: ADEM PFC Sampling - Gadsden

Report Number: 280-131137-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### RECEIPT

The samples were received on 11/20/2019 9:35 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.3° C.

### PERFLUORINATED HYDROCARBONS (PFC)

Samples GADSDEN-RAW (280-131137-1) and GADSDEN-FINISHED (280-131137-2) were analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 11/29/2019 and analyzed on 11/30/2019.

The following samples are flagged for ion ratio failure: GADSDEN-RAW (280-131137-1), GADSDEN-FINISHED (280-131137-2), (CCV 280-479288/11), (CCV 280-479288/3), (LCS 280-479106/2-A) and (LCSD 280-479106/3-A). It is in the laboratory analyst's judgment that the detections are real and are reported with the appropriate flags.

The Isotope Dilution Analyte (IDA) recovery associated with the sample GADSDEN-RAW is below the method recommended limit. Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample. All detection limits are below the lower calibration.

The method required MS/MSD could not be performed due to insufficient sample volume, however, a LCS/LCSD pair was analyzed to demonstrate method precision and accuracy.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Detection Summary

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Gadsden

Job ID: 280-131137-1

### Client Sample ID: GADSDEN-RAW

Lab Sample ID: 280-131137-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.033		0.017	0.0081	ug/L	1		DV-LC-0012	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.019	J I	0.025	0.011	ug/L	1		DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	0.057	I	0.017	0.0066	ug/L	1		DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	0.042	I	0.017	0.0081	ug/L	1		DV-LC-0012	Total/NA
Perfluorooctane sulfonate (PFOS)	0.061	I	0.025	0.011	ug/L	1		DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	0.085		0.025	0.0091	ug/L	1		DV-LC-0012	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.24	I	0.017	0.0068	ug/L	1		DV-LC-0012	Total/NA

### Client Sample ID: GADSDEN-FINISHED

Lab Sample ID: 280-131137-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.031		0.017	0.0086	ug/L	1		DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	0.040	I	0.017	0.0069	ug/L	1		DV-LC-0012	Total/NA
Perfluorooctane sulfonate (PFOS)	0.024	J I	0.026	0.012	ug/L	1		DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	0.071		0.026	0.0095	ug/L	1		DV-LC-0012	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.16	I	0.017	0.0072	ug/L	1		DV-LC-0012	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Denver



## Client Sample Results

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Gadsden

Job ID: 280-131137-1

**Client Sample ID: GADSDEN-RAW**

**Lab Sample ID: 280-131137-1**

Date Collected: 11/18/19 19:31

Matrix: Water

Date Received: 11/20/19 09:35

**Method: DV-LC-0012 - Fluorinated Alkyl Substances**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.033		0.017	0.0081	ug/L		11/29/19 14:51	11/30/19 13:35	1
Perfluorodecanoic acid (PFDA)	0.0065	U	0.017	0.0065	ug/L		11/29/19 14:51	11/30/19 13:35	1
Perfluorododecanoic acid (PFDoA)	0.012	U	0.025	0.012	ug/L		11/29/19 14:51	11/30/19 13:35	1
Perfluoroheptanoic acid (PFHpA)	0.019	J I	0.025	0.011	ug/L		11/29/19 14:51	11/30/19 13:35	1
Perfluorohexanoic acid (PFHxA)	0.057	I	0.017	0.0066	ug/L		11/29/19 14:51	11/30/19 13:35	1
Perfluorononanoic acid (PFNA)	0.0062	U	0.033	0.0062	ug/L		11/29/19 14:51	11/30/19 13:35	1
Perfluorooctanoic acid (PFOA)	0.042	I	0.017	0.0081	ug/L		11/29/19 14:51	11/30/19 13:35	1
Perfluorooctane sulfonate (PFOS)	0.061	I	0.025	0.011	ug/L		11/29/19 14:51	11/30/19 13:35	1
Perfluoropentanoic acid (PFPA)	0.085		0.025	0.0091	ug/L		11/29/19 14:51	11/30/19 13:35	1
Perfluorotetradecanoic acid (PFTeA)	0.012	U	0.025	0.012	ug/L		11/29/19 14:51	11/30/19 13:35	1
Perfluorotridecanoic acid (PFTriA)	0.015	U	0.033	0.015	ug/L		11/29/19 14:51	11/30/19 13:35	1
Perfluoroundecanoic acid (PFUnA)	0.0057	U	0.017	0.0057	ug/L		11/29/19 14:51	11/30/19 13:35	1
Perfluorobutanesulfonic acid (PFBS)	0.24	I	0.017	0.0068	ug/L		11/29/19 14:51	11/30/19 13:35	1
Perfluorodecanesulfonic acid (PFDS)	0.0076	U	0.017	0.0076	ug/L		11/29/19 14:51	11/30/19 13:35	1
Perfluorohexanesulfonic acid (PFHxS)	0.0058	U	0.025	0.0058	ug/L		11/29/19 14:51	11/30/19 13:35	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C8 PFOA	109		60 - 155				11/29/19 14:51	11/30/19 13:35	1
13C8 PFOS	126		45 - 130				11/29/19 14:51	11/30/19 13:35	1

**Client Sample ID: GADSDEN-FINISHED**

**Lab Sample ID: 280-131137-2**

Date Collected: 11/19/19 11:00

Matrix: Water

Date Received: 11/20/19 09:35

**Method: DV-LC-0012 - Fluorinated Alkyl Substances**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.031		0.017	0.0086	ug/L		11/29/19 14:51	11/30/19 13:44	1
Perfluorodecanoic acid (PFDA)	0.0068	U	0.017	0.0068	ug/L		11/29/19 14:51	11/30/19 13:44	1
Perfluorododecanoic acid (PFDoA)	0.013	U	0.026	0.013	ug/L		11/29/19 14:51	11/30/19 13:44	1
Perfluoroheptanoic acid (PFHpA)	0.012	U	0.026	0.012	ug/L		11/29/19 14:51	11/30/19 13:44	1
Perfluorohexanoic acid (PFHxA)	0.040	I	0.017	0.0069	ug/L		11/29/19 14:51	11/30/19 13:44	1
Perfluorononanoic acid (PFNA)	0.0065	U	0.035	0.0065	ug/L		11/29/19 14:51	11/30/19 13:44	1
Perfluorooctanoic acid (PFOA)	0.0085	U	0.017	0.0085	ug/L		11/29/19 14:51	11/30/19 13:44	1
Perfluorooctane sulfonate (PFOS)	0.024	J I	0.026	0.012	ug/L		11/29/19 14:51	11/30/19 13:44	1
Perfluoropentanoic acid (PFPA)	0.071		0.026	0.0095	ug/L		11/29/19 14:51	11/30/19 13:44	1
Perfluorotetradecanoic acid (PFTeA)	0.013	U	0.026	0.013	ug/L		11/29/19 14:51	11/30/19 13:44	1
Perfluorotridecanoic acid (PFTriA)	0.015	U	0.035	0.015	ug/L		11/29/19 14:51	11/30/19 13:44	1
Perfluoroundecanoic acid (PFUnA)	0.0060	U	0.017	0.0060	ug/L		11/29/19 14:51	11/30/19 13:44	1
Perfluorobutanesulfonic acid (PFBS)	0.16	I	0.017	0.0072	ug/L		11/29/19 14:51	11/30/19 13:44	1
Perfluorodecanesulfonic acid (PFDS)	0.0080	U	0.017	0.0080	ug/L		11/29/19 14:51	11/30/19 13:44	1
Perfluorohexanesulfonic acid (PFHxS)	0.0061	U	0.026	0.0061	ug/L		11/29/19 14:51	11/30/19 13:44	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C8 PFOA	107		60 - 155				11/29/19 14:51	11/30/19 13:44	1
13C8 PFOS	122		45 - 130				11/29/19 14:51	11/30/19 13:44	1

## Default Detection Limits

Client: Alabama Dept. Environmental Management  
Project/Site: ADEM PFC Sampling - Gadsden

Job ID: 280-131137-1

### Method: DV-LC-0012 - Fluorinated Alkyl Substances

Prep: 3535

Analyte	RL	MDL	Units
Perfluorobutanesulfonic acid (PFBS)	0.020	0.0082	ug/L
Perfluorobutanoic acid (PFBA)	0.020	0.0098	ug/L
Perfluorodecanesulfonic acid (PFDS)	0.020	0.0092	ug/L
Perfluorodecanoic acid (PFDA)	0.020	0.0078	ug/L
Perfluorododecanoic acid (PFDoA)	0.030	0.015	ug/L
Perfluoroheptanoic acid (PFHpA)	0.030	0.013	ug/L
Perfluorohexanesulfonic acid (PFHxS)	0.030	0.0070	ug/L
Perfluorohexanoic acid (PFHxA)	0.020	0.0079	ug/L
Perfluorononanoic acid (PFNA)	0.040	0.0075	ug/L
Perfluorooctane sulfonate (PFOS)	0.030	0.013	ug/L
Perfluorooctanoic acid (PFOA)	0.020	0.0098	ug/L
Perfluoropentanoic acid (PFPA)	0.030	0.011	ug/L
Perfluorotetradecanoic acid (PFTeA)	0.030	0.015	ug/L
Perfluorotridecanoic acid (PFTriA)	0.040	0.018	ug/L
Perfluoroundecanoic acid (PFUnA)	0.020	0.0069	ug/L