

ANALYTICAL REPORT

PREPARED FOR

Attn: Dr. Brant Landers
AECOM Technical Services Inc.
1001 Bishop Street
Ste 1600
Honolulu, Hawaii 96813

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JOB DESCRIPTION

PFAS, AFFF Concentrate

JOB NUMBER

320-95204-1

Eurofins Sacramento

Job Notes

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The data in the report relate to the field sample(s) as received by the laboratory and associated QC. All results have been reviewed and have been found to be compliant with laboratory and accreditation requirements, with the exception of the noted deviation(s). For questions, please contact the Project Manager.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northern California, LLC Project Manager.

Authorization



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Table of Contents

Cover Page	1
Table of Contents	3
Definitions/Glossary	4
Case Narrative	5
Detection Summary	7
Client Sample Results	8
Isotope Dilution Summary	15
QC Sample Results	17
QC Association Summary	24
Lab Chronicle	25
Certification Summary	26
Method Summary	27
Sample Summary	28
Chain of Custody	29
Receipt Checklists	30



Definitions/Glossary

Client: AECOM Technical Services Inc.
Project/Site: PFAS, AFFF Concentrate

Job ID: 320-95204-1

Qualifiers

LCMS

Qualifier	Qualifier Description
*5+	Isotope dilution analyte is outside acceptance limits, high biased.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Case Narrative

Client: AECOM Technical Services Inc.
Project/Site: PFAS, AFFF Concentrate

Job ID: 320-95204-1

Job ID: 320-95204-1

Laboratory: Eurofins Sacramento

Narrative

Receipt

The sample was received on 12/13/2022 9:20 AM. Unless otherwise noted below, the sample arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 9.4° C.

Receipt Exceptions

The following sample was received at the laboratory outside the required temperature criteria: ADIT6-PIPE-AFFFN01-22DEC (320-95204-1). Sample was received out of temperature at 9.4C. No cooling agent.

LCMS

Method 537 (modified): Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for the following sample: ADIT6-PIPE-AFFFN01-22DEC (320-95204-1). Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

Method 537 (modified): The low level continuing calibration verification (CCVL) associated with batch 320-642483 recovered above the upper control limit for 10:2 FTCA. The CCVL is used as a sensitivity check. The bracketing CCVs were within control limits. The sample associated with this CCV were non-detects for the affected analyte; therefore, the data have been reported.

Method 537 (modified): The transition mass ratio was outside the established ratio limit for 10:2 FTCA associated to this data set. This is indicated by the "R" flag in the raw data. The bracketing continuing calibration verifications (CCVs) are within control limits for this analyte. Therefore there is no impact on the data. (CCVL 320-642483/2)

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

Organic Prep

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

Enclosed are the Non-Target Analysis (NTA) results for the single sample submitted to Eurofins in Job 320-95204 with client ID 'ADIT6-PIPE-AFFFN01-22DEC'. Analysis was requested via LC-QTOF MS (liquid chromatography quadrupole time-of-flight mass spectrometry) for identification of potential PFAS analytes not determined in the routine targeted analyses that was also applied to this sample. The NTA determination inherently incurs an increased level of uncertainty and certified reference standards are not used to confirm reported results

Sample Preparation

1 mL of sample ADIT6-PIPE-AFFFN01-22DEC was diluted 1000X in water due to the potential for high concentrations of both target and non-target analytes, as well as the empirically observed characteristics of the sample (foaming). A 150 uL aliquot of the aqueous dilution was adjusted to a final volume of 300 uL with methanol and the resulting extract was analyzed by LC-QTOF MS.

Analysis

The sample extract was introduced into the LC system utilizing an optimized gradient to enhance the identification of early eluting compounds. The gradient ramps slowly over a period of 20 minutes where the compounds are separated on a 3x50mm Phenomenex Gemini C18 analytical column using 20mM ammonium acetate in water and methanol as mobile phases. The SCIEX X500r quadrupole time-of-flight mass spectrometer (QTOF MS) was set to run in sequential Electrospray Ionization (ESI) techniques in both positive and negative polarities utilizing the same gradient and mobile phases.

Results

Data were processed with SCIEX MarkerView deconvolution software. This software extracts the raw chromatograms across a defined mass range from 0-1500 amu and examines peaks of interest utilizing exact mass and MS/MS fragmentation. The peaks are compared to comprehensive fluorinated compound libraries where the software algorithm assigns possible matches to each peak, or feature. The observed features were then evaluated by a Eurofins analyst to confirm ample signal-to-noise as well as confirming the compound fit to the library match. The reported results include only peaks with a signal-to-noise greater than 10:1 and an absolute intensity greater than 1000 counts.

One limitation the software cannot account for are multiple isomers of the same compound. While the skeletal backbone and molecular formula will be the same, the match might represent a structural isomer of the identified compound.

These data are all qualitative in nature. While identified compounds do have different areas or intensities, this should not be interpreted as more or less abundant in the sample. Vastly different ionization efficiencies of NTA compounds can occur which impedes speculation about relative concentrations.

These results are summarized in the tables below.

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: PFAS, AFFF Concentrate

Job ID: 320-95204-1

Client Sample ID: ADIT6-PIPE-AFFFN01-22DEC

Lab Sample ID: 320-95204-1

Sample Analysis Not Complete.

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This Detection Summary does not include radiochemical test results.

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Client Sample Results

Client: AECOM Technical Services Inc.
Project/Site: PFAS, AFFF Concentrate

Job ID: 320-95204-1

Client Sample ID: ADIT6-PIPE-AFFFN01-22DEC

Lab Sample ID: 320-95204-1

Date Collected: 12/08/22 14:00

Matrix: Water

Date Received: 12/13/22 09:20

Method: EPA 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	880000		630000	300000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Perfluoropentanoic acid (PFPeA)	110000	J	250000	61000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Perfluorohexanoic acid (PFHxA)	1500000		250000	73000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Perfluoroheptanoic acid (PFHpA)	ND		250000	31000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Perfluorooctanoic acid (PFOA)	210000	J	250000	110000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Perfluorononanoic acid (PFNA)	ND		250000	34000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Perfluorodecanoic acid (PFDA)	ND		250000	39000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Perfluoroundecanoic acid (PFUnA)	ND		250000	140000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Perfluorododecanoic acid (PFDoA)	ND		250000	69000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Perfluorotridecanoic acid (PFTTrDA)	ND		250000	160000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Perfluorotetradecanoic acid (PFTeA)	ND		250000	91000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	ND		250000	110000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Perfluoro-n-octadecanoic acid (PFODA)	ND		250000	120000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Perfluorobutanesulfonic acid (PFBS)	ND		250000	25000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Perfluoropentanesulfonic acid (PFPeS)	ND		250000	38000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Perfluorohexanesulfonic acid (PFHxS)	ND		250000	71000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		250000	24000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Perfluorooctanesulfonic acid (PFOS)	ND		250000	68000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Perfluorononanesulfonic acid (PFNS)	ND		250000	46000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Perfluorodecanesulfonic acid (PFDS)	ND		250000	40000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Perfluorododecanesulfonic acid (PFDoS)	ND		250000	120000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Perfluorooctanesulfonamide (FOSA)	ND		250000	120000	ng/L		12/19/22 18:17	12/22/22 16:24	1
NMeFOSAA	ND		630000	150000	ng/L		12/19/22 18:17	12/22/22 16:24	1
NEtFOSAA	ND		630000	160000	ng/L		12/19/22 18:17	12/22/22 16:24	1
4:2 FTS	73000	J	250000	30000	ng/L		12/19/22 18:17	12/22/22 16:24	1
6:2 FTS	29000000		630000	310000	ng/L		12/19/22 18:17	12/22/22 16:24	1
8:2 FTS	ND		250000	58000	ng/L		12/19/22 18:17	12/22/22 16:24	1
10:2 FTS	ND		250000	84000	ng/L		12/19/22 18:17	12/22/22 16:24	1
NEtFOSA	ND		250000	110000	ng/L		12/19/22 18:17	12/22/22 16:24	1
NMeFOSA	ND		250000	54000	ng/L		12/19/22 18:17	12/22/22 16:24	1
NMeFOSE	ND		500000	180000	ng/L		12/19/22 18:17	12/22/22 16:24	1
NEtFOSE	ND		250000	110000	ng/L		12/19/22 18:17	12/22/22 16:24	1
HFPO-DA (GenX)	ND		500000	190000	ng/L		12/19/22 18:17	12/22/22 16:24	1
9CI-PF3ONS	ND		250000	30000	ng/L		12/19/22 18:17	12/22/22 16:24	1
11CI-PF3OUdS	ND		250000	40000	ng/L		12/19/22 18:17	12/22/22 16:24	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		250000	50000	ng/L		12/19/22 18:17	12/22/22 16:24	1
3:3 FTCA	ND		250000	54000	ng/L		12/19/22 18:17	12/22/22 16:24	1
5:3 FTCA	ND		250000	41000	ng/L		12/19/22 18:17	12/22/22 16:24	1
7:3 FTCA	ND		250000	69000	ng/L		12/19/22 18:17	12/22/22 16:24	1
6:2 FTCA	ND		250000	120000	ng/L		12/19/22 18:17	12/22/22 16:24	1
8:2 FTCA	ND		250000	41000	ng/L		12/19/22 18:17	12/22/22 16:24	1
10:2 FTCA	ND		380000	170000	ng/L		12/19/22 18:17	12/22/22 16:24	1
PFECHS	ND		250000	56000	ng/L		12/19/22 18:17	12/22/22 16:24	1
PFPPrS	ND		250000	30000	ng/L		12/19/22 18:17	12/22/22 16:24	1
NFDHA	ND		250000	78000	ng/L		12/19/22 18:17	12/22/22 16:24	1

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Client Sample Results

Client: AECOM Technical Services Inc.
Project/Site: PFAS, AFFF Concentrate

Job ID: 320-95204-1

Client Sample ID: ADIT6-PIPE-AFFFN01-22DEC

Lab Sample ID: 320-95204-1

Date Collected: 12/08/22 14:00

Matrix: Water

Date Received: 12/13/22 09:20

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFMBA	ND		250000	33000	ng/L		12/19/22 18:17	12/22/22 16:24	1
PFMPA	ND		250000	35000	ng/L		12/19/22 18:17	12/22/22 16:24	1
PFEESA	ND		250000	36000	ng/L		12/19/22 18:17	12/22/22 16:24	1
PFMOAA	ND		250000	51000	ng/L		12/19/22 18:17	12/22/22 16:24	1
PFPE-1	ND		250000	36000	ng/L		12/19/22 18:17	12/22/22 16:24	1
PFO4DA	ND		250000	50000	ng/L		12/19/22 18:17	12/22/22 16:24	1
PFO3OA	ND		250000	110000	ng/L		12/19/22 18:17	12/22/22 16:24	1
PFO2HxA	ND		250000	69000	ng/L		12/19/22 18:17	12/22/22 16:24	1
PFO5DA	ND		250000	130000	ng/L		12/19/22 18:17	12/22/22 16:24	1
PMPA	ND		250000	43000	ng/L		12/19/22 18:17	12/22/22 16:24	1
PEPA	ND		250000	60000	ng/L		12/19/22 18:17	12/22/22 16:24	1
PFPrA	ND		250000	44000	ng/L		12/19/22 18:17	12/22/22 16:24	1
R-EVE	ND		250000	39000	ng/L		12/19/22 18:17	12/22/22 16:24	1
NVHOS	ND		380000	160000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Hydro-EVE Acid	ND		250000	30000	ng/L		12/19/22 18:17	12/22/22 16:24	1
R-PSDCA	ND		380000	180000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Hydro-PS Acid	ND		250000	55000	ng/L		12/19/22 18:17	12/22/22 16:24	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	49		25 - 150				12/19/22 18:17	12/22/22 16:24	1
13C4 PFBA	114		25 - 150				12/19/22 18:17	12/22/22 16:24	1
13C5 PFPeA	118		25 - 150				12/19/22 18:17	12/22/22 16:24	1
13C2 PFHxA	107		25 - 150				12/19/22 18:17	12/22/22 16:24	1
13C4 PFHpA	112		25 - 150				12/19/22 18:17	12/22/22 16:24	1
13C4 PFOA	98		25 - 150				12/19/22 18:17	12/22/22 16:24	1
13C5 PFNA	93		25 - 150				12/19/22 18:17	12/22/22 16:24	1
13C2 PFDA	39		25 - 150				12/19/22 18:17	12/22/22 16:24	1
13C2 PFUnA	113		25 - 150				12/19/22 18:17	12/22/22 16:24	1
13C2 PFDoA	123		25 - 150				12/19/22 18:17	12/22/22 16:24	1
13C2 PFTeDA	105		25 - 150				12/19/22 18:17	12/22/22 16:24	1
13C2 PFHxDA	107		25 - 150				12/19/22 18:17	12/22/22 16:24	1
13C3 PFBS	107		25 - 150				12/19/22 18:17	12/22/22 16:24	1
18O2 PFHxS	106		25 - 150				12/19/22 18:17	12/22/22 16:24	1
13C4 PFOS	86		25 - 150				12/19/22 18:17	12/22/22 16:24	1
d3-NMeFOSAA	108		25 - 150				12/19/22 18:17	12/22/22 16:24	1
d5-NEtFOSAA	111		25 - 150				12/19/22 18:17	12/22/22 16:24	1
M2-4:2 FTS	107		25 - 150				12/19/22 18:17	12/22/22 16:24	1
M2-6:2 FTS	109		25 - 150				12/19/22 18:17	12/22/22 16:24	1
M2-8:2 FTS	37		25 - 150				12/19/22 18:17	12/22/22 16:24	1
13C2 10:2 FTS	297	*5+	25 - 150				12/19/22 18:17	12/22/22 16:24	1
d-N-MeFOSA-M	120		20 - 150				12/19/22 18:17	12/22/22 16:24	1
d-N-EtFOSA-M	109		20 - 150				12/19/22 18:17	12/22/22 16:24	1
d7-N-MeFOSE-M	125	*5+	10 - 120				12/19/22 18:17	12/22/22 16:24	1
d9-N-EtFOSE-M	120		10 - 120				12/19/22 18:17	12/22/22 16:24	1
13C3 HFPO-DA	115		25 - 150				12/19/22 18:17	12/22/22 16:24	1
13C-6:2 FTCA	114		25 - 150				12/19/22 18:17	12/22/22 16:24	1
13C-8:2 FTCA	117		25 - 150				12/19/22 18:17	12/22/22 16:24	1
13C-10:2 FTCA	153	*5+	25 - 150				12/19/22 18:17	12/22/22 16:24	1

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Summary 2022.12.27_SWNEG_B_007.wiff2 - 320-95204-A-1-A

#	Analyte Peak Name	Mass Error Confidence	Fragment Mass Error Confidence	RT Confidence	Isotope Confidence	Library Confidence	Formula Confidence	Ion Ratio Confidence	Sample Name
308	6:2 fluorotelomer thia propanoamido dimethyl ethyl sulfonate	✓	●	●	▲	✓	●	●	320-95204-A-1-A

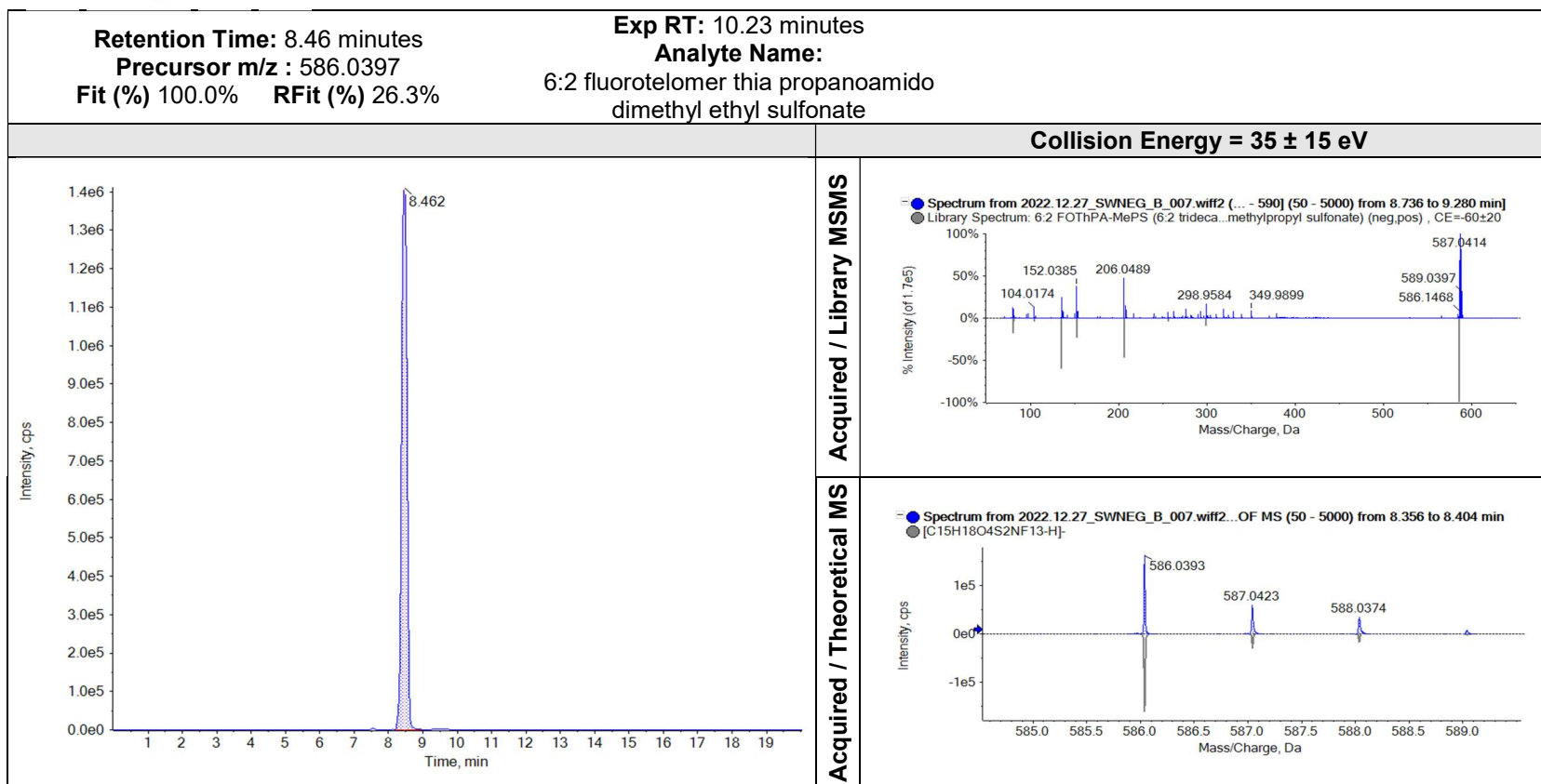
#	Analyte Peak Name	Sample Type	Component Name	Area	Calculated Concentration	Formula	Precursor Mass	Found At Mass	Mass Error (ppm)	Library Hit
308	6:2 fluorotelomer thia propanoamido dimethyl ethyl sulfonate	Unknown	6:2 fluorotelomer thia propanoamido dimethyl ethyl sulfonate	1.569e+07	<2 points	C15H18O4S2NF13	586.040	586.0393	-0.7	6:2 FOTPA-MePS (6:2 tridecafluorooctyl thiapropanoamido-methylpropyl sulfonate) (neg,pos) Smart Confirmation

#	Analyte Peak Name	Library Score	Isotope Ratio Difference
308	6:2 fluorotelomer thia propanoamido dimethyl ethyl sulfonate	100.0	18.5

End of Table

6:2 fluorotelomer thia propanoamido dimethyl ethyl sulfonate

(Mass/FragMass/RT/Isotope/Library/Formula/Ion Ratio)



Summary 2022.12.27_SWPOS_A_007.wiff2 - 320-95204-A-1-A

#	Analyte Peak Name	Mass Error Confidence	Fragment Mass Error Confidence	RT Confidence	Isotope Confidence	Library Confidence	Formula Confidence	Ion Ratio Confidence	Sample Name
76	6:2 fluorotelomer thia propanoamido dimethyl ethyl sulfonate	✓	●	●	▲	✓	●	●	320-95204-A-1-A
506	6:2 fluorotelomer thia hydroxy propyl trimethyl ammonium	✓	●	●	▲	✓	●	●	320-95204-A-1-A

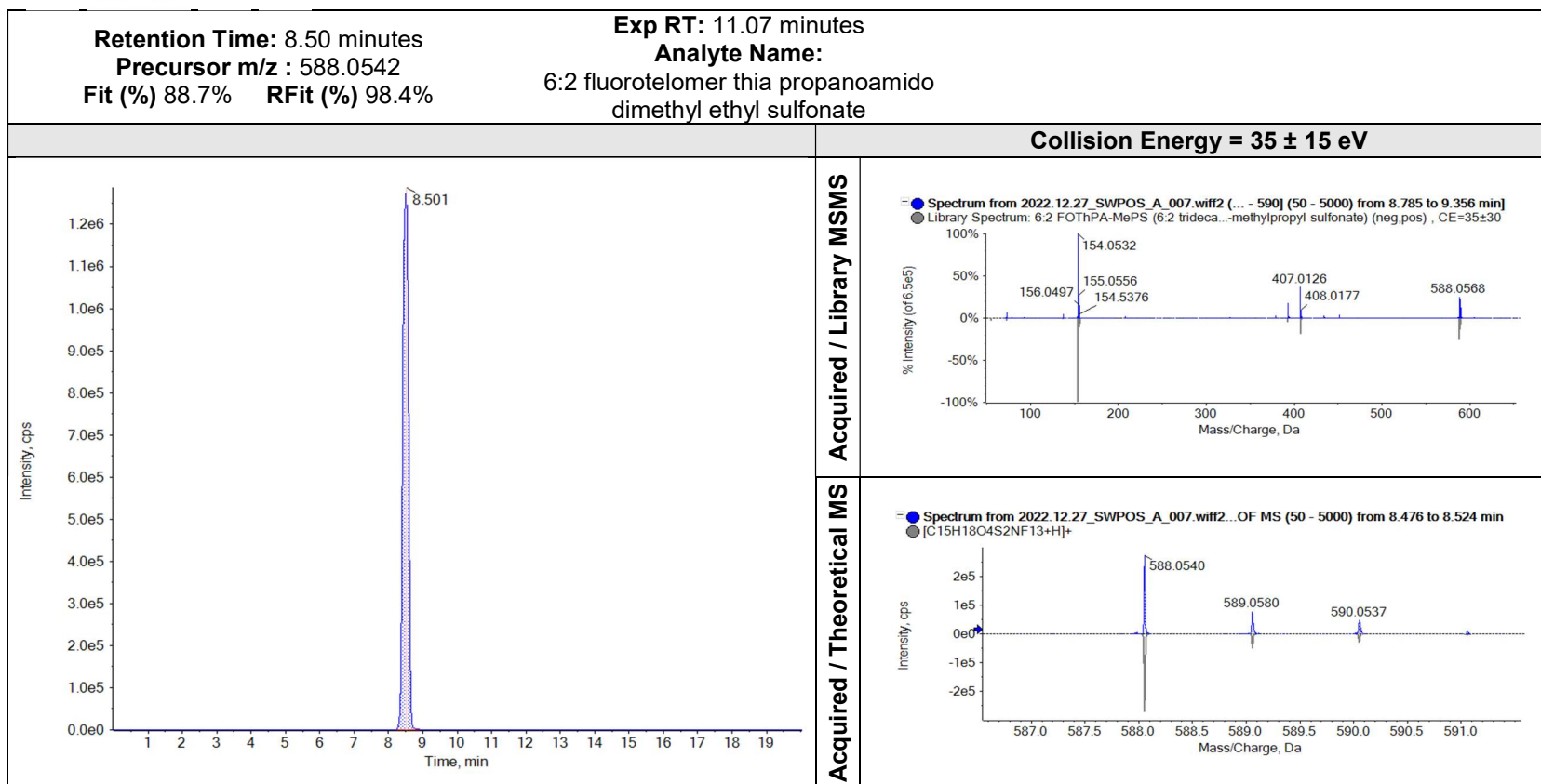
#	Analyte Peak Name	Sample Type	Component Name	Area	Calculated Concentration	Formula	Precursor Mass	Found At Mass	Mass Error (ppm)	Library Hit
76	6:2 fluorotelomer thia propanoamido dimethyl ethyl sulfonate	Unknown	6:2 fluorotelomer thia propanoamido dimethyl ethyl sulfonate	1.484e+07	<2 points	C15H18O4S2NF13	588.054	588.0540	-0.4	6:2 FOTHPA-MePS (6:2 tridecafluorooctyl thiapropanoamido-methylpropyl sulfonate) (neg,pos) Smart Confirmation
506	6:2 fluorotelomer thia hydroxy propyl trimethyl ammonium	Unknown	6:2 fluorotelomer thia hydroxy propyl trimethyl ammonium	7.664e+06	<2 points	C14H18OSNF13	496.097	496.0973	-0.3	6:2 fluorotelomer thioether 2-propanol trimethyl quaternary amine (pos) Smart Confirmation

#	Analyte Peak Name	Library Score	Isotope Ratio Difference
76	6:2 fluorotelomer thia propanoamido dimethyl ethyl sulfonate	88.7	10.2
506	6:2 fluorotelomer thia hydroxy propyl trimethyl ammonium	100.0	9.6

End of Table

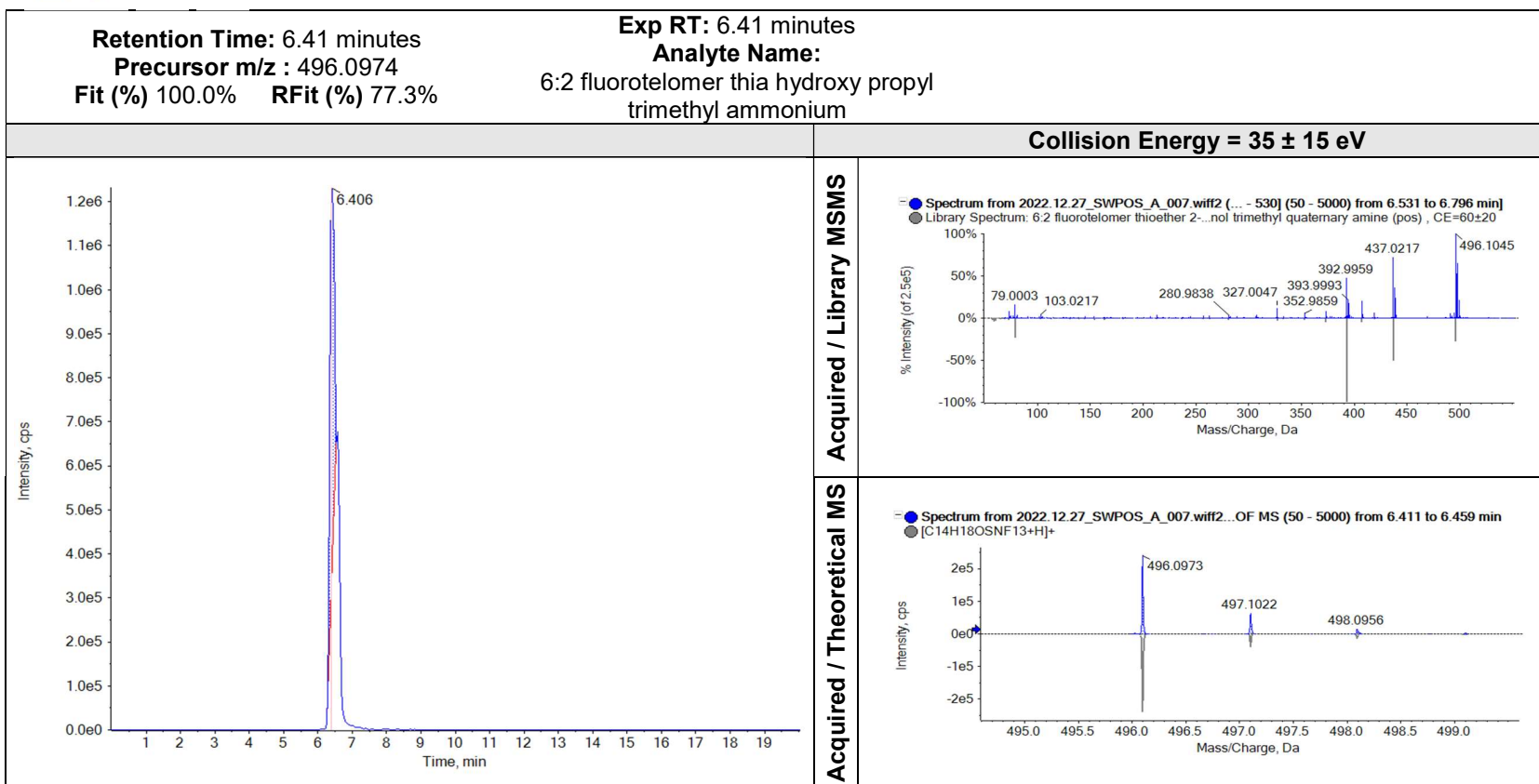
6:2 fluorotelomer thia propanoamido dimethyl ethyl sulfonate

(Mass/FragMass/RT/Isotope/Library/Formula/Ion Ratio)



6:2 fluorotelomer thia hydroxy propyl trimethyl ammonium

(Mass/FragMass/RT/Isotope/Library/Formula/Ion Ratio)



Isotope Dilution Summary

Client: AECOM Technical Services Inc.
Project/Site: PFAS, AFFF Concentrate

Job ID: 320-95204-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFOSA (25-150)	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	C4PFHA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)
320-95204-1	ADIT6-PIPE-AFFFN01-22DEC	49	114	118	107	112	98	93	39
LCS 320-641482/2-A	Lab Control Sample	113	109	112	105	103	102	113	105
LCSD 320-641482/3-A	Lab Control Sample Dup	104	101	103	99	101	101	110	98
MB 320-641482/1-A	Method Blank	108	106	113	104	107	104	110	104

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFUnA (25-150)	PFDoA (25-150)	PFTDA (25-150)	PFHxDA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	d3NMFOS (25-150)
320-95204-1	ADIT6-PIPE-AFFFN01-22DEC	113	123	105	107	107	106	86	108
LCS 320-641482/2-A	Lab Control Sample	106	81	93	93	107	104	99	108
LCSD 320-641482/3-A	Lab Control Sample Dup	104	97	97	90	96	96	94	96
MB 320-641482/1-A	Method Blank	101	98	95	88	101	99	93	99

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	d5NEFOS (25-150)	M242FTS (25-150)	M262FTS (25-150)	M282FTS (25-150)	M102FTS (25-150)	dMeFOSA (20-150)	dEtFOSA (20-150)	NMFM (10-120)
320-95204-1	ADIT6-PIPE-AFFFN01-22DEC	111	107	109	37	297 *5+	120	109	125 *5+
LCS 320-641482/2-A	Lab Control Sample	107	107	101	106	91	108	87	106
LCSD 320-641482/3-A	Lab Control Sample Dup	100	95	97	96	102	99	99	102
MB 320-641482/1-A	Method Blank	98	103	101	101	106	100	100	99

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	NEFM (10-120)	HFPODA (25-150)	MFHEA (25-150)	MFOEA (25-150)	MFDEA (25-150)
320-95204-1	ADIT6-PIPE-AFFFN01-22DEC	120	115	114	117	153 *5+
LCS 320-641482/2-A	Lab Control Sample	100	111	108	112	107
LCSD 320-641482/3-A	Lab Control Sample Dup	110	107	102	115	106
MB 320-641482/1-A	Method Blank	112	111	105	123	106

Surrogate Legend

PFOSA = 13C8 FOSA
PFBA = 13C4 PFBA
PFPeA = 13C5 PFPeA
PFHxA = 13C2 PFHxA
C4PFHA = 13C4 PFHpA
PFOA = 13C4 PFOA
PFNA = 13C5 PFNA
PFDA = 13C2 PFDA
PFUnA = 13C2 PFUnA
PFDoA = 13C2 PFDoA
PFTDA = 13C2 PFTeDA
PFHxDA = 13C2 PFHxDA
C3PFBS = 13C3 PFBS
PFHxS = 18O2 PFHxS
PFOS = 13C4 PFOS
d3NMFOS = d3-NMeFOSAA
d5NEFOS = d5-NEtFOSAA
M242FTS = M2-4:2 FTS
M262FTS = M2-6:2 FTS
M282FTS = M2-8:2 FTS
M102FTS = 13C2 10:2 FTS
dMeFOSA = d-N-MeFOSA-M

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Isotope Dilution Summary

Client: AECOM Technical Services Inc.
Project/Site: PFAS, AFFF Concentrate

Job ID: 320-95204-1

dEtFOSA = d-N-EtFOSA-M
NMFM = d7-N-MeFOSE-M
NEFM = d9-N-EtFOSE-M
HFPODA = 13C3 HFPO-DA
MFHEA = 13C-6:2 FTCA
MFOEA = 13C-8:2 FTCA
MFDEA = 13C-10:2 FTCA

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QC Sample Results

Client: AECOM Technical Services Inc.
Project/Site: PFAS, AFFF Concentrate

Job ID: 320-95204-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-641482/1-A

Matrix: Water

Analysis Batch: 642490

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 641482

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1300	600	ng/L		12/19/22 18:17	12/22/22 15:53	1
Perfluoropentanoic acid (PFPeA)	ND		500	120	ng/L		12/19/22 18:17	12/22/22 15:53	1
Perfluorohexanoic acid (PFHxA)	ND		500	150	ng/L		12/19/22 18:17	12/22/22 15:53	1
Perfluoroheptanoic acid (PFHpA)	ND		500	63	ng/L		12/19/22 18:17	12/22/22 15:53	1
Perfluorooctanoic acid (PFOA)	ND		500	210	ng/L		12/19/22 18:17	12/22/22 15:53	1
Perfluorononanoic acid (PFNA)	ND		500	68	ng/L		12/19/22 18:17	12/22/22 15:53	1
Perfluorodecanoic acid (PFDA)	ND		500	78	ng/L		12/19/22 18:17	12/22/22 15:53	1
Perfluoroundecanoic acid (PFUnA)	ND		500	280	ng/L		12/19/22 18:17	12/22/22 15:53	1
Perfluorododecanoic acid (PFDoA)	ND		500	140	ng/L		12/19/22 18:17	12/22/22 15:53	1
Perfluorotridecanoic acid (PFTrDA)	ND		500	330	ng/L		12/19/22 18:17	12/22/22 15:53	1
Perfluorotetradecanoic acid (PFTeA)	ND		500	180	ng/L		12/19/22 18:17	12/22/22 15:53	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	ND		500	220	ng/L		12/19/22 18:17	12/22/22 15:53	1
Perfluoro-n-octadecanoic acid (PFODA)	ND		500	240	ng/L		12/19/22 18:17	12/22/22 15:53	1
Perfluorobutanesulfonic acid (PFBS)	ND		500	50	ng/L		12/19/22 18:17	12/22/22 15:53	1
Perfluoropentanesulfonic acid (PFPeS)	ND		500	75	ng/L		12/19/22 18:17	12/22/22 15:53	1
Perfluorohexanesulfonic acid (PFHxS)	ND		500	140	ng/L		12/19/22 18:17	12/22/22 15:53	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		500	48	ng/L		12/19/22 18:17	12/22/22 15:53	1
Perfluorooctanesulfonic acid (PFOS)	ND		500	140	ng/L		12/19/22 18:17	12/22/22 15:53	1
Perfluorononanesulfonic acid (PFNS)	ND		500	93	ng/L		12/19/22 18:17	12/22/22 15:53	1
Perfluorodecanesulfonic acid (PFDS)	ND		500	80	ng/L		12/19/22 18:17	12/22/22 15:53	1
Perfluorododecanesulfonic acid (PFDoS)	ND		500	240	ng/L		12/19/22 18:17	12/22/22 15:53	1
Perfluorooctanesulfonamide (FOSA)	ND		500	250	ng/L		12/19/22 18:17	12/22/22 15:53	1
NMeFOSAA	ND		1300	300	ng/L		12/19/22 18:17	12/22/22 15:53	1
NEtFOSAA	ND		1300	330	ng/L		12/19/22 18:17	12/22/22 15:53	1
4:2 FTS	ND		500	60	ng/L		12/19/22 18:17	12/22/22 15:53	1
6:2 FTS	ND		1300	630	ng/L		12/19/22 18:17	12/22/22 15:53	1
8:2 FTS	ND		500	120	ng/L		12/19/22 18:17	12/22/22 15:53	1
10:2 FTS	ND		500	170	ng/L		12/19/22 18:17	12/22/22 15:53	1
NEtFOSA	ND		500	220	ng/L		12/19/22 18:17	12/22/22 15:53	1
NMeFOSA	ND		500	110	ng/L		12/19/22 18:17	12/22/22 15:53	1
NMeFOSE	ND		1000	350	ng/L		12/19/22 18:17	12/22/22 15:53	1
NEtFOSE	ND		500	210	ng/L		12/19/22 18:17	12/22/22 15:53	1
HFPO-DA (GenX)	ND		1000	380	ng/L		12/19/22 18:17	12/22/22 15:53	1
9CI-PF3ONS	ND		500	60	ng/L		12/19/22 18:17	12/22/22 15:53	1
11CI-PF3OUdS	ND		500	80	ng/L		12/19/22 18:17	12/22/22 15:53	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		500	100	ng/L		12/19/22 18:17	12/22/22 15:53	1
3:3 FTCA	ND		500	110	ng/L		12/19/22 18:17	12/22/22 15:53	1
5:3 FTCA	ND		500	83	ng/L		12/19/22 18:17	12/22/22 15:53	1
7:3 FTCA	ND		500	140	ng/L		12/19/22 18:17	12/22/22 15:53	1
6:2 FTCA	ND		500	240	ng/L		12/19/22 18:17	12/22/22 15:53	1
8:2 FTCA	ND		500	83	ng/L		12/19/22 18:17	12/22/22 15:53	1
10:2 FTCA	ND		750	340	ng/L		12/19/22 18:17	12/22/22 15:53	1
PFECHS	ND		500	110	ng/L		12/19/22 18:17	12/22/22 15:53	1
PFPrS	ND		500	60	ng/L		12/19/22 18:17	12/22/22 15:53	1

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QC Sample Results

Client: AECOM Technical Services Inc.
Project/Site: PFAS, AFFF Concentrate

Job ID: 320-95204-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-641482/1-A

Matrix: Water

Analysis Batch: 642490

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 641482

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
NFDHA	ND		500	160	ng/L		12/19/22 18:17	12/22/22 15:53	1
PFMBA	ND		500	65	ng/L		12/19/22 18:17	12/22/22 15:53	1
PFMPA	ND		500	70	ng/L		12/19/22 18:17	12/22/22 15:53	1
PFEESA	ND		500	73	ng/L		12/19/22 18:17	12/22/22 15:53	1
PFMOAA	ND		500	100	ng/L		12/19/22 18:17	12/22/22 15:53	1
PFPE-1	ND		500	73	ng/L		12/19/22 18:17	12/22/22 15:53	1
PFO4DA	ND		500	100	ng/L		12/19/22 18:17	12/22/22 15:53	1
PFO3OA	ND		500	220	ng/L		12/19/22 18:17	12/22/22 15:53	1
PFO2HxA	ND		500	140	ng/L		12/19/22 18:17	12/22/22 15:53	1
PFO5DA	ND		500	250	ng/L		12/19/22 18:17	12/22/22 15:53	1
PMPA	ND		500	85	ng/L		12/19/22 18:17	12/22/22 15:53	1
PEPA	ND		500	120	ng/L		12/19/22 18:17	12/22/22 15:53	1
PFPrA	ND		500	88	ng/L		12/19/22 18:17	12/22/22 15:53	1
R-EVE	ND		500	78	ng/L		12/19/22 18:17	12/22/22 15:53	1
NVHOS	ND		750	330	ng/L		12/19/22 18:17	12/22/22 15:53	1
Hydro-EVE Acid	ND		500	60	ng/L		12/19/22 18:17	12/22/22 15:53	1
R-PSDCA	ND		750	350	ng/L		12/19/22 18:17	12/22/22 15:53	1
Hydro-PS Acid	ND		500	110	ng/L		12/19/22 18:17	12/22/22 15:53	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	108		25 - 150	12/19/22 18:17	12/22/22 15:53	1
13C4 PFBA	106		25 - 150	12/19/22 18:17	12/22/22 15:53	1
13C5 PFPeA	113		25 - 150	12/19/22 18:17	12/22/22 15:53	1
13C2 PFHxA	104		25 - 150	12/19/22 18:17	12/22/22 15:53	1
13C4 PFHpA	107		25 - 150	12/19/22 18:17	12/22/22 15:53	1
13C4 PFOA	104		25 - 150	12/19/22 18:17	12/22/22 15:53	1
13C5 PFNA	110		25 - 150	12/19/22 18:17	12/22/22 15:53	1
13C2 PFDA	104		25 - 150	12/19/22 18:17	12/22/22 15:53	1
13C2 PFUnA	101		25 - 150	12/19/22 18:17	12/22/22 15:53	1
13C2 PFDoA	98		25 - 150	12/19/22 18:17	12/22/22 15:53	1
13C2 PFTeDA	95		25 - 150	12/19/22 18:17	12/22/22 15:53	1
13C2 PFHxDA	88		25 - 150	12/19/22 18:17	12/22/22 15:53	1
13C3 PFBS	101		25 - 150	12/19/22 18:17	12/22/22 15:53	1
18O2 PFHxS	99		25 - 150	12/19/22 18:17	12/22/22 15:53	1
13C4 PFOS	93		25 - 150	12/19/22 18:17	12/22/22 15:53	1
d3-NMeFOSAA	99		25 - 150	12/19/22 18:17	12/22/22 15:53	1
d5-NEtFOSAA	98		25 - 150	12/19/22 18:17	12/22/22 15:53	1
M2-4:2 FTS	103		25 - 150	12/19/22 18:17	12/22/22 15:53	1
M2-6:2 FTS	101		25 - 150	12/19/22 18:17	12/22/22 15:53	1
M2-8:2 FTS	101		25 - 150	12/19/22 18:17	12/22/22 15:53	1
13C2 10:2 FTS	106		25 - 150	12/19/22 18:17	12/22/22 15:53	1
d-N-MeFOSA-M	100		20 - 150	12/19/22 18:17	12/22/22 15:53	1
d-N-EtFOSA-M	100		20 - 150	12/19/22 18:17	12/22/22 15:53	1
d7-N-MeFOSE-M	99		10 - 120	12/19/22 18:17	12/22/22 15:53	1
d9-N-EtFOSE-M	112		10 - 120	12/19/22 18:17	12/22/22 15:53	1
13C3 HFPO-DA	111		25 - 150	12/19/22 18:17	12/22/22 15:53	1
13C-6:2 FTCA	105		25 - 150	12/19/22 18:17	12/22/22 15:53	1
13C-8:2 FTCA	123		25 - 150	12/19/22 18:17	12/22/22 15:53	1
13C-10:2 FTCA	106		25 - 150	12/19/22 18:17	12/22/22 15:53	1

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QC Sample Results

Client: AECOM Technical Services Inc.
Project/Site: PFAS, AFFF Concentrate

Job ID: 320-95204-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: LCS 320-641482/2-A

Matrix: Water

Analysis Batch: 642490

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 641482

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	10000	10100		ng/L		101	76 - 136
Perfluoropentanoic acid (PFPeA)	10000	9670		ng/L		97	71 - 131
Perfluorohexanoic acid (PFHxA)	10000	10600		ng/L		106	73 - 133
Perfluoroheptanoic acid (PFHpA)	10000	10700		ng/L		107	72 - 132
Perfluorooctanoic acid (PFOA)	10000	10500		ng/L		105	70 - 130
Perfluorononanoic acid (PFNA)	10000	9840		ng/L		98	75 - 135
Perfluorodecanoic acid (PFDA)	10000	10800		ng/L		108	76 - 136
Perfluoroundecanoic acid (PFUnA)	10000	10100		ng/L		101	68 - 128
Perfluorododecanoic acid (PFDoA)	10000	12700		ng/L		127	71 - 131
Perfluorotridecanoic acid (PFTTrDA)	10000	13100		ng/L		131	71 - 131
Perfluorotetradecanoic acid (PFTeA)	10000	10900		ng/L		109	70 - 130
Perfluoro-n-hexadecanoic acid (PFHxDA)	10000	10300		ng/L		103	76 - 136
Perfluoro-n-octadecanoic acid (PFODA)	10000	9850		ng/L		98	58 - 145
Perfluorobutanesulfonic acid (PFBS)	8880	8860		ng/L		100	67 - 127
Perfluoropentanesulfonic acid (PFPeS)	9400	9840		ng/L		105	66 - 126
Perfluorohexanesulfonic acid (PFHxS)	9120	9120		ng/L		100	59 - 119
Perfluoroheptanesulfonic acid (PFHpS)	9540	10400		ng/L		109	76 - 136
Perfluorooctanesulfonic acid (PFOS)	9300	9960		ng/L		107	70 - 130
Perfluorononanesulfonic acid (PFNS)	9620	11100		ng/L		115	75 - 135
Perfluorodecanesulfonic acid (PFDS)	9640	11100		ng/L		115	71 - 131
Perfluorododecanesulfonic acid (PFDoS)	9700	9600		ng/L		99	67 - 127
Perfluorooctanesulfonamide (FOSA)	10000	10300		ng/L		103	73 - 133
NMeFOSAA	10000	10300		ng/L		103	76 - 136
NEtFOSAA	10000	10400		ng/L		104	76 - 136
4:2 FTS	9380	9270		ng/L		99	79 - 139
6:2 FTS	9520	10300		ng/L		108	59 - 175
8:2 FTS	9600	9530		ng/L		99	75 - 135
10:2 FTS	9660	9340		ng/L		97	64 - 142
NEtFOSA	10000	11700		ng/L		117	78 - 138
NMeFOSA	10000	10400		ng/L		104	67 - 154
NMeFOSE	10000	10700		ng/L		107	70 - 130
NEtFOSE	10000	10200		ng/L		102	71 - 131
HFPO-DA (GenX)	10000	9720		ng/L		97	51 - 173
9Cl-PF3ONS	9340	10600		ng/L		113	75 - 135
11Cl-PF3OUdS	9440	10400		ng/L		111	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	9440	10400		ng/L		110	79 - 139

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QC Sample Results

Client: AECOM Technical Services Inc.
Project/Site: PFAS, AFFF Concentrate

Job ID: 320-95204-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-641482/2-A

Matrix: Water

Analysis Batch: 642490

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 641482

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
3:3 FTCA	10000	11100		ng/L		111	70 - 130
5:3 FTCA	10000	10400		ng/L		104	70 - 130
7:3 FTCA	10000	9970		ng/L		100	70 - 130
6:2 FTCA	10000	9220		ng/L		92	70 - 130
8:2 FTCA	10000	8070		ng/L		81	70 - 130
10:2 FTCA	10000	8730		ng/L		87	70 - 130
PFECHS	9240	10300		ng/L		111	70 - 130
PFPPrS	9200	9370		ng/L		102	70 - 130
NFDHA	10000	10700		ng/L		107	70 - 130
PFMBA	10000	10100		ng/L		101	70 - 130
PFMPA	10000	10200		ng/L		102	70 - 130
PFEESA	8920	9610		ng/L		108	70 - 130
PFMOAA	10000	10600		ng/L		106	70 - 130
PFPE-1	10000	10500		ng/L		105	70 - 130
PFO4DA	10000	11200		ng/L		112	70 - 130
PFO3OA	10000	11700		ng/L		117	70 - 130
PFO2HxA	10000	10100		ng/L		101	70 - 130
PFO5DA	10000	12200		ng/L		122	70 - 130
PMPA	10000	11500		ng/L		115	70 - 130
PEPA	10000	10800		ng/L		108	70 - 130
PFPPrA	9700	8560		ng/L		88	70 - 130
R-EVE	10000	10100		ng/L		101	70 - 130
NVHOS	10000	10800		ng/L		108	70 - 130
Hydro-EVE Acid	10000	11000		ng/L		110	70 - 130
R-PSDCA	10000	10400		ng/L		104	70 - 130
Hydro-PS Acid	10000	11100		ng/L		111	70 - 130

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C8 FOSA	113		25 - 150
13C4 PFBA	109		25 - 150
13C5 PFPeA	112		25 - 150
13C2 PFHxA	105		25 - 150
13C4 PFHpA	103		25 - 150
13C4 PFOA	102		25 - 150
13C5 PFNA	113		25 - 150
13C2 PFDA	105		25 - 150
13C2 PFUnA	106		25 - 150
13C2 PFDoA	81		25 - 150
13C2 PFTeDA	93		25 - 150
13C2 PFHxDA	93		25 - 150
13C3 PFBS	107		25 - 150
18O2 PFHxS	104		25 - 150
13C4 PFOS	99		25 - 150
d3-NMeFOSAA	108		25 - 150
d5-NEtFOSAA	107		25 - 150
M2-4:2 FTS	107		25 - 150
M2-6:2 FTS	101		25 - 150
M2-8:2 FTS	106		25 - 150
13C2 10:2 FTS	91		25 - 150

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QC Sample Results

Client: AECOM Technical Services Inc.
Project/Site: PFAS, AFFF Concentrate

Job ID: 320-95204-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-641482/2-A

Matrix: Water

Analysis Batch: 642490

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 641482

<i>Isotope Dilution</i>	<i>LCS %Recovery</i>	<i>LCS Qualifier</i>	<i>Limits</i>
d-N-MeFOSA-M	108		20 - 150
d-N-EtFOSA-M	87		20 - 150
d7-N-MeFOSE-M	106		10 - 120
d9-N-EtFOSE-M	100		10 - 120
13C3 HFPO-DA	111		25 - 150
13C-6:2 FTCA	108		25 - 150
13C-8:2 FTCA	112		25 - 150
13C-10:2 FTCA	107		25 - 150

Lab Sample ID: LCSD 320-641482/3-A

Matrix: Water

Analysis Batch: 642490

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 641482

<i>Analyte</i>	<i>Spike Added</i>	<i>LCSD Result</i>	<i>LCSD Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec Limits</i>	<i>RPD</i>	<i>RPD Limit</i>
Perfluorobutanoic acid (PFBA)	10000	9830		ng/L		98	76 - 136	2	30
Perfluoropentanoic acid (PFPeA)	10000	9610		ng/L		96	71 - 131	1	30
Perfluorohexanoic acid (PFHxA)	10000	10300		ng/L		103	73 - 133	3	30
Perfluoroheptanoic acid (PFHpA)	10000	10600		ng/L		106	72 - 132	1	30
Perfluorooctanoic acid (PFOA)	10000	10400		ng/L		104	70 - 130	1	30
Perfluorononanoic acid (PFNA)	10000	9470		ng/L		95	75 - 135	4	30
Perfluorodecanoic acid (PFDA)	10000	10700		ng/L		107	76 - 136	0	30
Perfluoroundecanoic acid (PFUnA)	10000	9650		ng/L		96	68 - 128	4	30
Perfluorododecanoic acid (PFDoA)	10000	10900		ng/L		109	71 - 131	15	30
Perfluorotridecanoic acid (PFTrDA)	10000	12000		ng/L		120	71 - 131	9	30
Perfluorotetradecanoic acid (PFTeA)	10000	9430		ng/L		94	70 - 130	14	30
Perfluoro-n-hexadecanoic acid (PFHxDA)	10000	10200		ng/L		102	76 - 136	1	30
Perfluoro-n-octadecanoic acid (PFODA)	10000	9630		ng/L		96	58 - 145	2	30
Perfluorobutanesulfonic acid (PFBS)	8880	9170		ng/L		103	67 - 127	3	30
Perfluoropentanesulfonic acid (PFPeS)	9400	9730		ng/L		104	66 - 126	1	30
Perfluorohexanesulfonic acid (PFHxS)	9120	9080		ng/L		100	59 - 119	0	30
Perfluoroheptanesulfonic acid (PFHpS)	9540	10400		ng/L		109	76 - 136	1	30
Perfluorooctanesulfonic acid (PFOS)	9300	9490		ng/L		102	70 - 130	5	30
Perfluorononanesulfonic acid (PFNS)	9620	10400		ng/L		109	75 - 135	6	30
Perfluorodecanesulfonic acid (PFDS)	9640	10200		ng/L		106	71 - 131	8	30
Perfluorododecanesulfonic acid (PFDoS)	9700	10500		ng/L		109	67 - 127	9	30
Perfluorooctanesulfonamide (FOSA)	10000	10000		ng/L		100	73 - 133	3	30
NMeFOSAA	10000	10600		ng/L		106	76 - 136	3	30
NEtFOSAA	10000	9790		ng/L		98	76 - 136	6	30

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QC Sample Results

Client: AECOM Technical Services Inc.
Project/Site: PFAS, AFFF Concentrate

Job ID: 320-95204-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-641482/3-A

Matrix: Water

Analysis Batch: 642490

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 641482

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
4:2 FTS	9380	9090		ng/L		97	79 - 139	2	30
6:2 FTS	9520	9780		ng/L		103	59 - 175	5	30
8:2 FTS	9600	9230		ng/L		96	75 - 135	3	30
10:2 FTS	9660	9330		ng/L		97	64 - 142	0	30
NEtFOSA	10000	11000		ng/L		110	78 - 138	7	30
NMeFOSA	10000	10300		ng/L		103	67 - 154	1	30
NMeFOSE	10000	10900		ng/L		109	70 - 130	2	30
NEtFOSE	10000	10500		ng/L		105	71 - 131	3	30
HFPO-DA (GenX)	10000	9800		ng/L		98	51 - 173	1	30
9CI-PF3ONS	9340	10000		ng/L		108	75 - 135	5	30
11CI-PF3OUdS	9440	9820		ng/L		104	54 - 114	6	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	9440	10200		ng/L		108	79 - 139	2	30
3:3 FTCA	10000	11500		ng/L		115	70 - 130	3	30
5:3 FTCA	10000	10100		ng/L		101	70 - 130	2	30
7:3 FTCA	10000	8770		ng/L		88	70 - 130	13	30
6:2 FTCA	10000	10600		ng/L		106	70 - 130	14	30
8:2 FTCA	10000	7860		ng/L		79	70 - 130	3	30
10:2 FTCA	10000	9090		ng/L		91	70 - 130	4	30
PFECHS	9240	9390		ng/L		102	70 - 130	9	30
PFPrS	9200	9660		ng/L		105	70 - 130	3	30
NFDHA	10000	10500		ng/L		105	70 - 130	2	30
PFMBA	10000	10300		ng/L		103	70 - 130	2	30
PFMPA	10000	10200		ng/L		102	70 - 130	0	30
PFEESA	8920	9680		ng/L		109	70 - 130	1	30
PFMOAA	10000	10900		ng/L		109	70 - 130	2	30
PFPE-1	10000	10400		ng/L		104	70 - 130	1	30
PFO4DA	10000	10400		ng/L		104	70 - 130	7	30
PFO3OA	10000	10800		ng/L		108	70 - 130	8	30
PFO2HxA	10000	11000		ng/L		110	70 - 130	9	30
PFO5DA	10000	10200		ng/L		102	70 - 130	18	30
PMPA	10000	11600		ng/L		116	70 - 130	0	30
PEPA	10000	10900		ng/L		109	70 - 130	1	30
PFPrA	9700	8750		ng/L		90	70 - 130	2	30
R-EVE	10000	9920		ng/L		99	70 - 130	1	30
NVHOS	10000	11400		ng/L		114	70 - 130	5	30
Hydro-EVE Acid	10000	10600		ng/L		106	70 - 130	3	30
R-PSDCA	10000	10200		ng/L		102	70 - 130	2	30
Hydro-PS Acid	10000	10400		ng/L		104	70 - 130	6	30

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
13C8 FOSA	104		25 - 150
13C4 PFBA	101		25 - 150
13C5 PFPeA	103		25 - 150
13C2 PFHxA	99		25 - 150
13C4 PFHpA	101		25 - 150
13C4 PFOA	101		25 - 150
13C5 PFNA	110		25 - 150
13C2 PFDA	98		25 - 150

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QC Sample Results

Client: AECOM Technical Services Inc.
Project/Site: PFAS, AFFF Concentrate

Job ID: 320-95204-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-641482/3-A

Matrix: Water

Analysis Batch: 642490

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 641482

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
13C2 PFUnA	104		25 - 150
13C2 PFDoA	97		25 - 150
13C2 PFTeDA	97		25 - 150
13C2 PFHxDA	90		25 - 150
13C3 PFBS	96		25 - 150
18O2 PFHxS	96		25 - 150
13C4 PFOS	94		25 - 150
d3-NMeFOSAA	96		25 - 150
d5-NEtFOSAA	100		25 - 150
M2-4:2 FTS	95		25 - 150
M2-6:2 FTS	97		25 - 150
M2-8:2 FTS	96		25 - 150
13C2 10:2 FTS	102		25 - 150
d-N-MeFOSA-M	99		20 - 150
d-N-EtFOSA-M	99		20 - 150
d7-N-MeFOSE-M	102		10 - 120
d9-N-EtFOSE-M	110		10 - 120
13C3 HFPO-DA	107		25 - 150
13C-6:2 FTCA	102		25 - 150
13C-8:2 FTCA	115		25 - 150
13C-10:2 FTCA	106		25 - 150

QC Association Summary

Client: AECOM Technical Services Inc.
Project/Site: PFAS, AFFF Concentrate

Job ID: 320-95204-1

LCMS

Prep Batch: 641482

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-95204-1	ADIT6-PIPE-AFFFN01-22DEC	Total/NA	Water	3535	
MB 320-641482/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-641482/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-641482/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 642490

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-95204-1	ADIT6-PIPE-AFFFN01-22DEC	Total/NA	Water	537 (modified)	641482
MB 320-641482/1-A	Method Blank	Total/NA	Water	537 (modified)	641482
LCS 320-641482/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	641482
LCSD 320-641482/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	641482

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: PFAS, AFFF Concentrate

Job ID: 320-95204-1

Client Sample ID: ADIT6-PIPE-AFFFN01-22DEC

Lab Sample ID: 320-95204-1

Date Collected: 12/08/22 14:00

Matrix: Water

Date Received: 12/13/22 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			0.002 mL	10.0 mL	641482	12/19/22 18:17	FX	EET SAC
Total/NA	Analysis	537 (modified)		1	1 mL	1 mL	642490	12/22/22 16:24	RS1	EET SAC

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: AECOM Technical Services Inc.
Project/Site: PFAS, AFFF Concentrate

Job ID: 320-95204-1

Laboratory: Eurofins Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	02-20-24
ANAB	Dept. of Defense ELAP	L2468	01-20-24
ANAB	Dept. of Energy	L2468.01	01-20-24
ANAB	ISO/IEC 17025	L2468	01-20-24
Arizona	State	AZ0708	08-11-23
Arkansas DEQ	State	88-0691	06-17-23
California	State	2897	01-31-23
Colorado	State	CA0004	08-31-23
Florida	NELAP	E87570	06-30-23
Georgia	State	4040	01-30-23
Hawaii	State	<cert No.>	01-29-23
Illinois	NELAP	200060	03-17-24
Kansas	NELAP	E-10375	10-31-23
Louisiana	NELAP	01944	06-30-23
Louisiana (All)	NELAP	01944	06-30-23
Maine	State	CA00004	04-14-24
Michigan	State	9947	01-31-23
Nevada	State	CA00044	07-31-23
New Hampshire	NELAP	2997	04-18-23
New Jersey	NELAP	CA005	06-30-23
New York	NELAP	11666	04-01-23
Ohio	State	41252	01-29-23
Oregon	NELAP	4040	01-29-23
Texas	NELAP	T104704399-19-13	05-31-23
US Fish & Wildlife	US Federal Programs	58448	04-30-23
USDA	US Federal Programs	P330-18-00239	01-23-23
Utah	NELAP	CA000442021-12	02-28-23
Virginia	NELAP	460278	03-14-23
Washington	State	C581	05-05-23
Wisconsin	State	998204680	08-31-23
Wyoming	State Program	8TMS-L	01-28-19 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

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Method Summary

Client: AECOM Technical Services Inc.
Project/Site: PFAS, AFFF Concentrate

Job ID: 320-95204-1

Method	Method Description	Protocol	Laboratory
537 (modified)	Fluorinated Alkyl Substances	EPA	EET SAC
3535	Solid-Phase Extraction (SPE)	SW846	EET SAC

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: AECOM Technical Services Inc.
Project/Site: PFAS, AFFF Concentrate

Job ID: 320-95204-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-95204-1	ADIT6-PIPE-AFFFN01-22DEC	Water	12/08/22 14:00	12/13/22 09:20

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

Chain of Custody Record

Client Information		Lab PW: 2212W2EU-09	
Carrier Tracking No(s): FedEx		Page: Page 1 of 1	
Sample: Aaron Oliver		Job #:	
Client Contact: Elaine Walker		State of Origin: Hawaii	
E-Mail: M.Elaine.Walker@EurofinsET.com		Analysis Requested	
PWSID:		Due Date Requested: see subcontract	
Address: 1001 Bishop St. Suite 1600		TAT Requested (days): Rush - ASAP	
City: Honolulu		Compliance Project: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
State, Zip: Hawaii 96813		PO #:	
Phone: 808-954-4512 / 808-356-5311		WO #:	
Email: Watson.Tanji@aeecom.com / Brant.Landers@aeecom.com		Project #:	
Project Name: CTO N6274223F0104		SSOW #:	
Site: RHSE		Sample Identification	
ADIT6-PIPE-AFFFN01-22DEC		Sample Date: 12/18/22	
		Sample Time: 1400	
		Sample Type (C=Comp, G=grab): G	
		Matrix (Water, Solid, BT=Tissue, A=Air)	
		Field Filtered Sample (Yes or No):	
		Performance MS/MSD (Yes or No):	
		PFAS Extended List (70 Analytes) by 537MOD	
		PFAS for Non-Target Analysis by LC/OTOFMS by 537MOD	
		Total Number of Containers: 23	
		Special Instructions/Note: Store ALL samples until notified by client to dispose 12/12/23	
		Barcode: 320-95204 Chain of Custody	
		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	
		Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For <input type="checkbox"/> Months	
		Special Instructions/OC Requirements: DOD QSM project.	
		Time: Date: Method of Shipment:	
Received by: Company: AECOM		Received by: Company: AECOM	
Date/Time: 12/12/22		Date/Time: 12/12/22	
Reinforced by: Alex Edmundo		Reinforced by: [Signature]	
Reinforced by: [Signature]		Reinforced by: [Signature]	
Custody Seal No.: 98		Cooler Temperature(s) °C and Other Remarks: 98	

Ver: 01/16/2019

155-1141 512-1322

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 320-95204-1

Login Number: 95204

List Source: Eurofins Sacramento

List Number: 1

Creator: Oropeza, Salvador

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	seal
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	
Cooler Temperature is acceptable.	False	Refer to Job Narrative for details.
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	False	Refer to Job Narrative for details.
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	