

ANALYTICAL REPORT

PREPARED FOR

Attn: Roger Brewer
Hawaii Department of Health
919 Ala Moana Blvd
Room 206
Honolulu, Hawaii 96814

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JOB DESCRIPTION

Red Hill AFFF

JOB NUMBER

320-99812-1

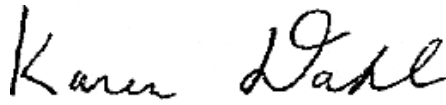
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Job Notes

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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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Authorized for release by
Karen Dahl, Senior Project Manager
Karen.Dahl@et.eurofinsus.com
(916)374-4384

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Definitions/Glossary

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

Qualifiers

LCMS

Qualifier	Qualifier Description
*-	LCS and/or LCSD is outside acceptance limits, low biased.
*+	LCS and/or LCSD is outside acceptance limits, high biased.
*1	LCS/LCSD RPD exceeds control limits.
*5-	Isotope dilution analyte is outside acceptance limits, low biased.
*5+	Isotope dilution analyte is outside acceptance limits, high biased.
B	Compound was found in the blank and sample.

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: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

Job ID: 320-99812-1

Laboratory: Eurofins Sacramento

Narrative

Comments

No additional comments.

Receipt

The sample was received on 5/3/2023 10:00 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 16.3° C.

LCMS

Method 537 (modified): Some of the Isotope Dilution Analyte (IDA) recoveries are below the method recommended limit for the following samples: (LCS 320-673229/2-A), (LCSD 320-673229/3-A) and (MB 320-673229/1-A). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDAs for these samples.

Method 537 (modified): Some Isotope Dilution Analyte (IDA) recoveries are above the method recommended limit for the following samples: (LCSD 320-673229/3-A) and (MB 320-673229/1-A). Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

Method 537 (modified): The labeled analyte M2-4:2FTS is converted to PFBA during the oxidation step of the TOP assay. The PFBA results in the Post-Treatment Method Blank (MB) indicates how much of a field sample's Post-Treatment PFBA result is contributed by the Reverse Surrogate, when adjusted for dilution factors. (MB 320-673494/1-A)

Method 537 (modified): Zero percent recovery of precursor analytes (such as 4:2 FTS, 6:2 FTS, 8:2 FTS, FOSA, NMeFOSAA, NEtFOSAA, etc.) and enhanced recoveries of PFCA is observed in the Post-Treatment Laboratory Control Sample (LCS) and Post-Treatment Laboratory Control Sample Duplicate (LCSD) associated with these samples, consistent with the expected oxidation of precursor analytes. The existing LCS control limits are based upon our historical performance for a set of 24-36 analytes in the LCS solution. We have recently expanded to 70+ analytes. As the LCS solution now contains new/additional precursor analytes we are seeing enhanced recoveries for some PFCA vs. the historical limits as a result. The LCS results are flagged as being high and outside of the established limits for some analytes; however, this is a function of the new analytes in the LCS solution and not indicative of an "out of control" process. (LCS 320-673494/2-A) and (LCSD 320-673494/3-A)

Method 537 (modified): The labeled analyte M2-4:2 FTS is employed in this analysis as a "Reverse Surrogate". It is used to monitor the oxidation efficiency of the TOP assay. This analyte is fortified into all sample fractions prior to any processing. The recovery of this analyte should be 0% in Post-Treatment fractions, indicating complete oxidation of the sample. RH-AFFF (320-99812-1), (LCS 320-673494/2-A), (LCSD 320-673494/3-A) and (MB 320-673494/1-A)

Method 537 (modified): The RPD of the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 320-673494 and analytical batch 320-683172 recovered outside control limits for the following analytes: Perfluorododecanoic acid (PFDoA) and Perfluorotetradecanoic acid (PFTeA).

Method 537 (modified): Results for samples RH-AFFF (320-99812-1) were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits.

Method 537 (modified): The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 320-673229 and analytical batch 320-679114 recovered outside control limits for the following analytes: N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA), N-methylperfluorooctane sulfonamide (NMeFOSA), N-methylperfluorooctane sulfonamidoethanol (NMeFOSE) and N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE).

Method 537 (modified): The labeled analyte M2-4:2 FTS is employed in this analysis as a "Reverse Surrogate". It is used to monitor the oxidation efficiency of the TOP assay. This analyte is fortified into all sample fractions prior to any processing. The recovery of this analyte should be 0% in Post-Treatment fractions, indicating complete oxidation of the sample. RH-AFFF (320-99812-1), (LCS 320-673229/2-A), (LCSD 320-673229/3-A) and (MB 320-673229/1-A)

Case Narrative

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

Job ID: 320-99812-1 (Continued)

Laboratory: Eurofins Sacramento (Continued)

Method 537 (modified): The RPD of the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 320-673229 and analytical batch 320-679114 recovered outside control limits for the following analytes: N-ethylperfluorooctane sulfonamide (NEtFOSA) and N-methylperfluorooctane sulfonamidoethanol (NMeFOSE).

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.

Detection Summary

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

Client Sample ID: RH-AFFF

Lab Sample ID: 320-99812-1

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	940000		630000		ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanoic acid (PFHxA)	1500000		250000		ng/L	1		537 (modified)	Pre-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	29000000		630000		ng/L	1		537 (modified)	Pre-Treatment
6:2 FTUCA	860000		250000		ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanoic acid (PFBA)	5000000000	*+ B	630000000		ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanoic acid (PFHxA)	2600000000	*+ B	250000000		ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanoic acid (PFHpA)	4500000000	*+	250000000		ng/L	1		537 (modified)	Post-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	1100000000		630000000		ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanoic acid (PFPeA) - DL	1000000000	*+ B	130000000		ng/L	5		537 (modified)	Post-Treatment
PFBA	5000000000				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	1000000000				ng/L	1		Total PFCA-Dif	Total/NA
PFHxA	2600000000				ng/L	1		Total PFCA-Dif	Total/NA
PFHpA	4500000000				ng/L	1		Total PFCA-Dif	Total/NA
PFOA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFNA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
Total PFCA	1800000000				ng/L	1		Total PFCA-Dif	Total/NA
Total PFCA	2400000				ng/L	1		Total PFCA-Sum	Pre-Treatment
Total PFCA	1800000000				ng/L	1		Total PFCA-Sum	Post-Treatment

This Detection Summary does not include radiochemical test results.

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Client Sample Results

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

Client Sample ID: RH-AFFF

Lab Sample ID: 320-99812-1

Date Collected: 04/28/23 12:00

Matrix: Water

Date Received: 05/03/23 10:00

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	940000		630000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Perfluoropentanoic acid (PFPeA)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Perfluorohexanoic acid (PFHxA)	1500000		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Perfluoroheptanoic acid (PFHpA)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Perfluorooctanoic acid (PFOA)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Perfluorononanoic acid (PFNA)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Perfluorodecanoic acid (PFDA)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Perfluoroundecanoic acid (PFUnA)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Perfluorododecanoic acid (PFDoA)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Perfluorotridecanoic acid (PFTrDA)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Perfluorotetradecanoic acid (PFTeA)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Perfluorobutanesulfonic acid (PFBS)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Perfluoropentanesulfonic acid (PFPeS)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Perfluorohexanesulfonic acid (PFHxS)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Perfluorooctanesulfonic acid (PFOS)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Perfluorononanesulfonic acid (PFNS)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Perfluorodecanesulfonic acid (PFDS)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Perfluorododecanesulfonic acid (PFDoS)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Perfluorooctanesulfonamide (FOSA)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		630000		ng/L		05/08/23 22:26	05/21/23 04:38	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		630000		ng/L		05/08/23 22:26	05/21/23 04:38	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	29000000		630000		ng/L		05/08/23 22:26	05/21/23 04:38	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	*- *1	250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	*-	250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND	*- *1	500000		ng/L		05/08/23 22:26	05/21/23 04:38	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	*-	250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		500000		ng/L		05/08/23 22:26	05/21/23 04:38	1
9CI-PF3ONS	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
11CI-PF3OUdS	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
3:3 FTCA	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
5:3 FTCA	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
7:3 FTCA	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
6:2 FTUCA	860000		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1

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Client Sample Results

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

Client Sample ID: RH-AFFF

Lab Sample ID: 320-99812-1

Date Collected: 04/28/23 12:00

Matrix: Water

Date Received: 05/03/23 10:00

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

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		250000		ng/L		05/08/23 22:26	05/21/23 04:38	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	70		25 - 150				05/08/23 22:26	05/21/23 04:38	1
13C4 PFBA	118		25 - 150				05/08/23 22:26	05/21/23 04:38	1
13C5 PFPeA	115		25 - 150				05/08/23 22:26	05/21/23 04:38	1
13C2 PFHxA	115		25 - 150				05/08/23 22:26	05/21/23 04:38	1
13C4 PFHpA	131		25 - 150				05/08/23 22:26	05/21/23 04:38	1
13C4 PFOA	120		25 - 150				05/08/23 22:26	05/21/23 04:38	1
13C5 PFNA	128		25 - 150				05/08/23 22:26	05/21/23 04:38	1
13C2 PFDA	45		25 - 150				05/08/23 22:26	05/21/23 04:38	1
13C2 PFUnA	119		25 - 150				05/08/23 22:26	05/21/23 04:38	1
13C2 PFDoA	138		25 - 150				05/08/23 22:26	05/21/23 04:38	1
13C2 PFTeDA	117		25 - 150				05/08/23 22:26	05/21/23 04:38	1
13C3 PFBS	123		25 - 150				05/08/23 22:26	05/21/23 04:38	1
18O2 PFHxS	138		25 - 150				05/08/23 22:26	05/21/23 04:38	1
13C4 PFOS	123		25 - 150				05/08/23 22:26	05/21/23 04:38	1
d3-NMeFOSAA	112		25 - 150				05/08/23 22:26	05/21/23 04:38	1
d5-NEtFOSAA	118		25 - 150				05/08/23 22:26	05/21/23 04:38	1
M2-4:2 FTS	113		25 - 150				05/08/23 22:26	05/21/23 04:38	1
13C2 6:2 FTS	137		25 - 150				05/08/23 22:26	05/21/23 04:38	1
13C2 8:2 FTS	39		25 - 150				05/08/23 22:26	05/21/23 04:38	1
d-N-MeFOSA-M	78		25 - 150				05/08/23 22:26	05/21/23 04:38	1
d-N-EtFOSA-M	61		25 - 150				05/08/23 22:26	05/21/23 04:38	1
d7-N-MeFOSE-M	33		25 - 150				05/08/23 22:26	05/21/23 04:38	1
d9-N-EtFOSE-M	26		25 - 150				05/08/23 22:26	05/21/23 04:38	1
13C3 HFPO-DA	113		25 - 150				05/08/23 22:26	05/21/23 04:38	1
13C-6:2 FTCA	86		25 - 150				05/08/23 22:26	05/21/23 04:38	1
13C-8:2 FTCA	91		25 - 150				05/08/23 22:26	05/21/23 04:38	1
13C-6:2 FTUCA	126		25 - 150				05/08/23 22:26	05/21/23 04:38	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	5000000000	*+ B	630000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Perfluorohexanoic acid (PFHxA)	2600000000	*+ B	250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Perfluoroheptanoic acid (PFHpA)	4500000000	*+	250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Perfluorooctanoic acid (PFOA)	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Perfluorononanoic acid (PFNA)	ND	*+	250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Perfluorodecanoic acid (PFDA)	ND	*+	250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Perfluoroundecanoic acid (PFUnA)	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Perfluorododecanoic acid (PFDoA)	ND	*- *1	250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Perfluorotridecanoic acid (PFTeDA)	ND	*- *1	250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Perfluorotetradecanoic acid (PFTeA)	ND	*-	250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Perfluorobutanesulfonic acid (PFBS)	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1

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Client Sample Results

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

Client Sample ID: RH-AFFF

Lab Sample ID: 320-99812-1

Date Collected: 04/28/23 12:00

Matrix: Water

Date Received: 05/03/23 10:00

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

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanesulfonic acid (PFPeS)	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Perfluorohexanesulfonic acid (PFHxS)	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Perfluorooctanesulfonic acid (PFOS)	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Perfluorononanesulfonic acid (PFNS)	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Perfluorodecanesulfonic acid (PFDS)	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Perfluorododecanesulfonic acid (PFDoS)	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Perfluorooctanesulfonamide (FOSA)	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		630000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		630000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	1100000000	0	630000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		500000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
9Cl-PF3ONS	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		500000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
11Cl-PF3OUdS	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
3:3 FTCA	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
5:3 FTCA	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
7:3 FTCA	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	+	250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
6:2 FTUCA	ND		250000000		ng/L		05/10/23 07:59	06/14/23 01:54	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	94		25 - 150				05/10/23 07:59	06/14/23 01:54	1
13C4 PFBA	70		25 - 150				05/10/23 07:59	06/14/23 01:54	1
13C5 PFPeA	77		25 - 150				05/10/23 07:59	06/14/23 01:54	1
13C2 PFHxA	83		25 - 150				05/10/23 07:59	06/14/23 01:54	1
13C4 PFHpA	92		25 - 150				05/10/23 07:59	06/14/23 01:54	1
13C4 PFOA	91		25 - 150				05/10/23 07:59	06/14/23 01:54	1

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Client Sample Results

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

Client Sample ID: RH-AFFF

Lab Sample ID: 320-99812-1

Date Collected: 04/28/23 12:00

Matrix: Water

Date Received: 05/03/23 10:00

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

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFNA	91		25 - 150	05/10/23 07:59	06/14/23 01:54	1
13C2 PFDA	94		25 - 150	05/10/23 07:59	06/14/23 01:54	1
13C2 PFUnA	93		25 - 150	05/10/23 07:59	06/14/23 01:54	1
13C2 PFDoA	89		25 - 150	05/10/23 07:59	06/14/23 01:54	1
13C2 PFTeDA	89		25 - 150	05/10/23 07:59	06/14/23 01:54	1
13C3 PFBS	84		25 - 150	05/10/23 07:59	06/14/23 01:54	1
18O2 PFHxS	88		25 - 150	05/10/23 07:59	06/14/23 01:54	1
13C4 PFOS	88		25 - 150	05/10/23 07:59	06/14/23 01:54	1
d3-NMeFOSAA	83		25 - 150	05/10/23 07:59	06/14/23 01:54	1
d5-NEtFOSAA	86		25 - 150	05/10/23 07:59	06/14/23 01:54	1
M2-4:2 FTS	0		0 - 10	05/10/23 07:59	06/14/23 01:54	1
13C2 6:2 FTS	110		25 - 150	05/10/23 07:59	06/14/23 01:54	1
13C2 8:2 FTS	102		25 - 150	05/10/23 07:59	06/14/23 01:54	1
d-N-MeFOSA-M	77		25 - 150	05/10/23 07:59	06/14/23 01:54	1
d-N-EtFOSA-M	74		25 - 150	05/10/23 07:59	06/14/23 01:54	1
d7-N-MeFOSE-M	73		25 - 150	05/10/23 07:59	06/14/23 01:54	1
d9-N-EtFOSE-M	67		25 - 150	05/10/23 07:59	06/14/23 01:54	1
13C3 HFPO-DA	81		25 - 150	05/10/23 07:59	06/14/23 01:54	1
13C-6:2 FTCA	98		25 - 150	05/10/23 07:59	06/14/23 01:54	1
13C-8:2 FTCA	99		25 - 150	05/10/23 07:59	06/14/23 01:54	1
13C-6:2 FTUCA	85		25 - 150	05/10/23 07:59	06/14/23 01:54	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment - DL

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanoic acid (PFPeA)	1000000000 00	*+ B	1300000000 0		ng/L		05/10/23 07:59	06/15/23 15:16	5
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	86		25 - 150				05/10/23 07:59	06/15/23 15:16	5
13C4 PFBA	70		25 - 150				05/10/23 07:59	06/15/23 15:16	5
13C5 PFPeA	80		25 - 150				05/10/23 07:59	06/15/23 15:16	5
13C2 PFHxA	83		25 - 150				05/10/23 07:59	06/15/23 15:16	5
13C4 PFHpA	88		25 - 150				05/10/23 07:59	06/15/23 15:16	5
13C4 PFOA	80		25 - 150				05/10/23 07:59	06/15/23 15:16	5
13C5 PFNA	90		25 - 150				05/10/23 07:59	06/15/23 15:16	5
13C2 PFDA	91		25 - 150				05/10/23 07:59	06/15/23 15:16	5
13C2 PFUnA	87		25 - 150				05/10/23 07:59	06/15/23 15:16	5
13C2 PFDoA	87		25 - 150				05/10/23 07:59	06/15/23 15:16	5
13C2 PFTeDA	84		25 - 150				05/10/23 07:59	06/15/23 15:16	5
13C3 PFBS	87		25 - 150				05/10/23 07:59	06/15/23 15:16	5
18O2 PFHxS	89		25 - 150				05/10/23 07:59	06/15/23 15:16	5
13C4 PFOS	78		25 - 150				05/10/23 07:59	06/15/23 15:16	5
d3-NMeFOSAA	72		25 - 150				05/10/23 07:59	06/15/23 15:16	5
d5-NEtFOSAA	78		25 - 150				05/10/23 07:59	06/15/23 15:16	5
M2-4:2 FTS	0		0 - 10				05/10/23 07:59	06/15/23 15:16	5
13C2 6:2 FTS	99		25 - 150				05/10/23 07:59	06/15/23 15:16	5
13C2 8:2 FTS	96		25 - 150				05/10/23 07:59	06/15/23 15:16	5
d-N-MeFOSA-M	74		25 - 150				05/10/23 07:59	06/15/23 15:16	5
d-N-EtFOSA-M	58		25 - 150				05/10/23 07:59	06/15/23 15:16	5
d7-N-MeFOSE-M	57		25 - 150				05/10/23 07:59	06/15/23 15:16	5
d9-N-EtFOSE-M	52		25 - 150				05/10/23 07:59	06/15/23 15:16	5

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Client Sample Results

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

Client Sample ID: RH-AFFF

Lab Sample ID: 320-99812-1

Date Collected: 04/28/23 12:00

Matrix: Water

Date Received: 05/03/23 10:00

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

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	87		25 - 150	05/10/23 07:59	06/15/23 15:16	5
13C-6:2 FTCA	90		25 - 150	05/10/23 07:59	06/15/23 15:16	5
13C-8:2 FTCA	74		25 - 150	05/10/23 07:59	06/15/23 15:16	5
13C-6:2 FTUCA	78		25 - 150	05/10/23 07:59	06/15/23 15:16	5

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	5000000000 0				ng/L			07/20/23 16:12	1
PFPA	1000000000 00				ng/L			07/20/23 16:12	1
PFHxA	2600000000 0				ng/L			07/20/23 16:12	1
PFHpA	4500000000				ng/L			07/20/23 16:12	1
PFOA	0.00				ng/L			07/20/23 16:12	1
PFNA	0.00				ng/L			07/20/23 16:12	1
Total PFCA	1800000000 00				ng/L			07/20/23 16:12	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Total PFCA	2400000				ng/L			07/20/23 16:07	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Total PFCA	1800000000 00				ng/L			07/20/23 16:10	1

Total Oxidation Precursors

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

TestAmerica Job ID: 320-99812-1

Client Sample ID: RH-AFFF

Lab Sample ID: 320-99812-1
Matrix: Water

Analyte	Pre-Treatment Method			Post-Treatment Method			Difference ¹	
	537 (modified)			537 (modified)				
	Result	Qualifier	Unit	Result	Qualifier	Unit	Result	Unit
Perfluorobutanoic acid (PFBA)	940000		ng/L	5000000000		ng/L	5000000000	ng/L
				0			0	
Perfluoropentanoic acid (PFPeA)	ND		ng/L	1000000000		ng/L	1000000000	ng/L
				00			00	
Perfluorohexanoic acid (PFHxA)	1500000		ng/L	2600000000		ng/L	2600000000	ng/L
				0			0	
Perfluoroheptanoic acid (PFHpA)	ND		ng/L	4500000000		ng/L	4500000000	ng/L
Perfluorooctanoic acid (PFOA)	ND		ng/L	ND		ng/L	0.00	ng/L
Perfluorononanoic acid (PFNA)	ND		ng/L	ND		ng/L	0.00	ng/L
Total PFCA	2400000		ng/L	1800000000		ng/L	1800000000	ng/L
				00			00	

¹ Difference = Post-Treatment - Pre-Treatment

Isotope Dilution Summary

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Pre-Treatment

		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)
320-99812-1	RH-AFFF	70	118	115	115	131	120	128	45
LCS 320-673229/2-A	Lab Control Sample	100	100	100	106	111	113	107	114
LCSD 320-673229/3-A	Lab Control Sample Dup	105	103	104	108	115	113	111	115
MB 320-673229/1-A	Method Blank	105	104	102	106	115	117	114	121
		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFUnA (25-150)	PFDoA (25-150)	PFTDA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	d3NMFOS (25-150)	d5NEFOS (25-150)
320-99812-1	RH-AFFF	119	138	117	123	138	123	112	118
LCS 320-673229/2-A	Lab Control Sample	111	108	109	100	119	111	100	103
LCSD 320-673229/3-A	Lab Control Sample Dup	113	118	112	102	121	111	104	111
MB 320-673229/1-A	Method Blank	111	117	112	104	122	113	103	111
		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	M242FTS (25-150)	M262FTS (25-150)	M282FTS (25-150)	dMeFOSA (25-150)	dEtFOSA (25-150)	NMFM (25-150)	NEFM (25-150)	HFPODA (25-150)
320-99812-1	RH-AFFF	113	137	39	78	61	33	26	113
LCS 320-673229/2-A	Lab Control Sample	102	119	142	62	46	21 *5-	16 *5-	106
LCSD 320-673229/3-A	Lab Control Sample Dup	112	125	167 *5+	62	46	20 *5-	18 *5-	106
MB 320-673229/1-A	Method Blank	100	121	161 *5+	62	48	22 *5-	19 *5-	103
		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	MFHEA (25-150)	MFOEA (25-150)	MFHUEA (25-150)					
320-99812-1	RH-AFFF	86	91	126					
LCS 320-673229/2-A	Lab Control Sample	75	77	110					
LCSD 320-673229/3-A	Lab Control Sample Dup	76	79	107					
MB 320-673229/1-A	Method Blank	78	83	109					

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
 C3PFBS = 13C3 PFBS
 PFHxS = 18O2 PFHxS
 PFOS = 13C4 PFOS
 d3NMFOS = d3-NMeFOSAA
 d5NEFOS = d5-NEtFOSAA
 M242FTS = M2-4:2 FTS
 M262FTS = 13C2 6:2 FTS
 M282FTS = 13C2 8:2 FTS
 dMeFOSA = d-N-MeFOSA-M
 dEtFOSA = d-N-EtFOSA-M
 NMFM = d7-N-MeFOSE-M

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Isotope Dilution Summary

Client: Hawaii Department of Health

Job ID: 320-99812-1

Project/Site: Red Hill AFFF

NEFM = d9-N-EtFOSE-M

HFPODA = 13C3 HFPO-DA

MFHEA = 13C-6:2 FTCA

MFOEA = 13C-8:2 FTCA

MFHUEA = 13C-6:2 FTUCA

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Post-Treatment

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)
320-99812-1	RH-AFFF	94	70	77	83	92	91	91	94
320-99812-1 - DL	RH-AFFF	86	70	80	83	88	80	90	91
LCS 320-673494/2-A	Lab Control Sample	99	48	87	89	87	87	90	97
LCSD 320-673494/3-A	Lab Control Sample Dup	100	88	88	94	90	93	96	99
MB 320-673494/1-A	Method Blank	101	58	94	91	97	97	94	100

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFUnA (25-150)	PFDoA (25-150)	PFTDA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	d3NMFOS (25-150)	d5NEFOS (25-150)
320-99812-1	RH-AFFF	93	89	89	84	88	88	83	86
320-99812-1 - DL	RH-AFFF	87	87	84	87	89	78	72	78
LCS 320-673494/2-A	Lab Control Sample	97	86	91	93	91	87	93	90
LCSD 320-673494/3-A	Lab Control Sample Dup	98	97	96	94	98	92	91	99
MB 320-673494/1-A	Method Blank	105	90	89	97	100	90	96	94

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	M242FTS (0-10)	M262FTS (25-150)	M282FTS (25-150)	dMeFOSA (25-150)	dEtFOSA (25-150)	NMFM (25-150)	NEFM (25-150)	HFPODA (25-150)
320-99812-1	RH-AFFF	0	110	102	77	74	73	67	81
320-99812-1 - DL	RH-AFFF	0	99	96	74	58	57	52	87
LCS 320-673494/2-A	Lab Control Sample	0	103	112	78	75	71	70	86
LCSD 320-673494/3-A	Lab Control Sample Dup	0	109	123	80	71	77	76	90
MB 320-673494/1-A	Method Blank	0	107	117	90	79	83	75	88

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	MFHEA (25-150)	MFOEA (25-150)	MFHUEA (25-150)					
320-99812-1	RH-AFFF	98	99	85					
320-99812-1 - DL	RH-AFFF	90	74	78					
LCS 320-673494/2-A	Lab Control Sample	100	95	92					
LCSD 320-673494/3-A	Lab Control Sample Dup	101	110	97					
MB 320-673494/1-A	Method Blank	105	109	92					

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

C3PFBS = 13C3 PFBS

PFHxS = 18O2 PFHxS

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Isotope Dilution Summary

Client: Hawaii Department of Health

Project/Site: Red Hill AFFF

Job ID: 320-99812-1

PFOS = 13C4 PFOS
d3NMFOS = d3-NMeFOSAA
d5NEFOS = d5-NEtFOSAA
M242FTS = M2-4:2 FTS
M262FTS = 13C2 6:2 FTS
M282FTS = 13C2 8:2 FTS
dMeFOSA = d-N-MeFOSA-M
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
MFHUEA = 13C-6:2 FTUCA

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QC Sample Results

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-673229/1-A

Matrix: Water

Analysis Batch: 679114

Client Sample ID: Method Blank

Prep Type: Pre-Treatment

Prep Batch: 673229

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		13		ng/L		05/08/23 22:26	05/21/23 03:31	1
Perfluoropentanoic acid (PFPeA)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Perfluorohexanoic acid (PFHxA)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Perfluoroheptanoic acid (PFHpA)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Perfluorooctanoic acid (PFOA)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Perfluorononanoic acid (PFNA)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Perfluorodecanoic acid (PFDA)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Perfluoroundecanoic acid (PFUnA)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Perfluorododecanoic acid (PFDoA)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Perfluorotridecanoic acid (PFTrDA)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Perfluorotetradecanoic acid (PFTeA)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Perfluorobutanesulfonic acid (PFBS)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Perfluoropentanesulfonic acid (PFPeS)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Perfluorohexanesulfonic acid (PFHxS)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Perfluorooctanesulfonic acid (PFOS)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Perfluorononanesulfonic acid (PFNS)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Perfluorodecanesulfonic acid (PFDS)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Perfluorododecanesulfonic acid (PFDoS)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Perfluorooctanesulfonamide (FOSA)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		13		ng/L		05/08/23 22:26	05/21/23 03:31	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		13		ng/L		05/08/23 22:26	05/21/23 03:31	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		13		ng/L		05/08/23 22:26	05/21/23 03:31	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		10		ng/L		05/08/23 22:26	05/21/23 03:31	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		10		ng/L		05/08/23 22:26	05/21/23 03:31	1
9CI-PF3ONS	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
11CI-PF3OUdS	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
3:3 FTCA	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
5:3 FTCA	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
7:3 FTCA	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1

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QC Sample Results

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

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

Lab Sample ID: MB 320-673229/1-A

Matrix: Water

Analysis Batch: 679114

Client Sample ID: Method Blank

Prep Type: Pre-Treatment

Prep Batch: 673229

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
6:2 FTUCA	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		5.0		ng/L		05/08/23 22:26	05/21/23 03:31	1
Isotope Dilution	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	105		25 - 150				05/08/23 22:26	05/21/23 03:31	1
13C4 PFBA	104		25 - 150				05/08/23 22:26	05/21/23 03:31	1
13C5 PFPeA	102		25 - 150				05/08/23 22:26	05/21/23 03:31	1
13C2 PFHxA	106		25 - 150				05/08/23 22:26	05/21/23 03:31	1
13C4 PFHpA	115		25 - 150				05/08/23 22:26	05/21/23 03:31	1
13C4 PFOA	117		25 - 150				05/08/23 22:26	05/21/23 03:31	1
13C5 PFNA	114		25 - 150				05/08/23 22:26	05/21/23 03:31	1
13C2 PFDA	121		25 - 150				05/08/23 22:26	05/21/23 03:31	1
13C2 PFUnA	111		25 - 150				05/08/23 22:26	05/21/23 03:31	1
13C2 PFDoA	117		25 - 150				05/08/23 22:26	05/21/23 03:31	1
13C2 PFTeDA	112		25 - 150				05/08/23 22:26	05/21/23 03:31	1
13C3 PFBS	104		25 - 150				05/08/23 22:26	05/21/23 03:31	1
18O2 PFHxS	122		25 - 150				05/08/23 22:26	05/21/23 03:31	1
13C4 PFOS	113		25 - 150				05/08/23 22:26	05/21/23 03:31	1
d3-NMeFOSAA	103		25 - 150				05/08/23 22:26	05/21/23 03:31	1
d5-NEtFOSAA	111		25 - 150				05/08/23 22:26	05/21/23 03:31	1
M2-4:2 FTS	100		25 - 150				05/08/23 22:26	05/21/23 03:31	1
13C2 6:2 FTS	121		25 - 150				05/08/23 22:26	05/21/23 03:31	1
13C2 8:2 FTS	161	*5+	25 - 150				05/08/23 22:26	05/21/23 03:31	1
d-N-MeFOSA-M	62		25 - 150				05/08/23 22:26	05/21/23 03:31	1
d-N-EtFOSA-M	48		25 - 150				05/08/23 22:26	05/21/23 03:31	1
d7-N-MeFOSE-M	22	*5-	25 - 150				05/08/23 22:26	05/21/23 03:31	1
d9-N-EtFOSE-M	19	*5-	25 - 150				05/08/23 22:26	05/21/23 03:31	1
13C3 HFPO-DA	103		25 - 150				05/08/23 22:26	05/21/23 03:31	1
13C-6:2 FTCA	78		25 - 150				05/08/23 22:26	05/21/23 03:31	1
13C-8:2 FTCA	83		25 - 150				05/08/23 22:26	05/21/23 03:31	1
13C-6:2 FTUCA	109		25 - 150				05/08/23 22:26	05/21/23 03:31	1

Lab Sample ID: LCS 320-673229/2-A

Matrix: Water

Analysis Batch: 679114

Client Sample ID: Lab Control Sample

Prep Type: Pre-Treatment

Prep Batch: 673229

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	100	108		ng/L		108	76 - 136
Perfluoropentanoic acid (PFPeA)	100	101		ng/L		101	71 - 131
Perfluorohexanoic acid (PFHxA)	100	92.3		ng/L		92	73 - 133
Perfluoroheptanoic acid (PFHpA)	100	98.7		ng/L		99	72 - 132
Perfluorooctanoic acid (PFOA)	100	97.3		ng/L		97	70 - 130
Perfluorononanoic acid (PFNA)	100	109		ng/L		109	75 - 135
Perfluorodecanoic acid (PFDA)	100	111		ng/L		111	76 - 136

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QC Sample Results

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

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

Lab Sample ID: LCS 320-673229/2-A

Matrix: Water

Analysis Batch: 679114

Client Sample ID: Lab Control Sample

Prep Type: Pre-Treatment

Prep Batch: 673229

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluoroundecanoic acid (PFUnA)	100	114		ng/L		114	68 - 128
Perfluorododecanoic acid (PFDoA)	100	100		ng/L		100	71 - 131
Perfluorotridecanoic acid (PFTrDA)	100	90.0		ng/L		90	71 - 131
Perfluorotetradecanoic acid (PFTeA)	100	76.3		ng/L		76	70 - 130
Perfluorobutanesulfonic acid (PFBS)	88.8	93.4		ng/L		105	67 - 127
Perfluoropentanesulfonic acid (PFPeS)	94.0	104		ng/L		110	66 - 126
Perfluorohexanesulfonic acid (PFHxS)	91.2	82.5		ng/L		90	59 - 119
Perfluoroheptanesulfonic acid (PFHpS)	95.4	101		ng/L		106	76 - 136
Perfluorooctanesulfonic acid (PFOS)	93.0	92.0		ng/L		99	70 - 130
Perfluorononanesulfonic acid (PFNS)	96.2	92.2		ng/L		96	75 - 135
Perfluorodecanesulfonic acid (PFDS)	96.4	93.5		ng/L		97	71 - 131
Perfluorododecanesulfonic acid (PFDoS)	97.0	72.8		ng/L		75	67 - 127
Perfluorooctanesulfonamide (FOSA)	100	94.9		ng/L		95	73 - 133
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	101		ng/L		101	76 - 136
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	90.5		ng/L		91	76 - 136
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	106		ng/L		113	79 - 139
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	114		ng/L		120	59 - 175
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	105		ng/L		109	75 - 135
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	46.2	*-	ng/L		46	78 - 138
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	55.6	*-	ng/L		56	67 - 154
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	44.2	*-	ng/L		44	70 - 130
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	35.9	*-	ng/L		36	71 - 131
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	94.3		ng/L		94	51 - 173
9CI-PF3ONS	93.4	92.7		ng/L		99	75 - 135
11CI-PF3OUdS	94.4	82.9		ng/L		88	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	95.0		ng/L		101	79 - 139
3:3 FTCA	100	86.4		ng/L		86	70 - 130
5:3 FTCA	100	118		ng/L		118	70 - 130
7:3 FTCA	100	116		ng/L		116	70 - 130
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	97.1		ng/L		97	70 - 130

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QC Sample Results

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

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

Lab Sample ID: LCS 320-673229/2-A

Matrix: Water

Analysis Batch: 679114

Client Sample ID: Lab Control Sample

Prep Type: Pre-Treatment

Prep Batch: 673229

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	104		ng/L		104	70 - 130
6:2 FTUCA	100	86.5		ng/L		87	70 - 130
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	104		ng/L		104	70 - 130
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	89.2	97.9		ng/L		110	70 - 130

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C8 FOSA	100		25 - 150
13C4 PFBA	100		25 - 150
13C5 PFPeA	100		25 - 150
13C2 PFHxA	106		25 - 150
13C4 PFHpA	111		25 - 150
13C4 PFOA	113		25 - 150
13C5 PFNA	107		25 - 150
13C2 PFDA	114		25 - 150
13C2 PFUnA	111		25 - 150
13C2 PFDoA	108		25 - 150
13C2 PFTeDA	109		25 - 150
13C3 PFBS	100		25 - 150
18O2 PFHxS	119		25 - 150
13C4 PFOS	111		25 - 150
d3-NMeFOSAA	100		25 - 150
d5-NEtFOSAA	103		25 - 150
M2-4:2 FTS	102		25 - 150
13C2 6:2 FTS	119		25 - 150
13C2 8:2 FTS	142		25 - 150
d-N-MeFOSA-M	62		25 - 150
d-N-EtFOSA-M	46		25 - 150
d7-N-MeFOSE-M	21	*5-	25 - 150
d9-N-EtFOSE-M	16	*5-	25 - 150
13C3 HFPO-DA	106		25 - 150
13C-6:2 FTCA	75		25 - 150
13C-8:2 FTCA	77		25 - 150
13C-6:2 FTUCA	110		25 - 150

Lab Sample ID: LCSD 320-673229/3-A

Matrix: Water

Analysis Batch: 679114

Client Sample ID: Lab Control Sample Dup

Prep Type: Pre-Treatment

Prep Batch: 673229

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA)	100	104		ng/L		104	76 - 136	4	30
Perfluoropentanoic acid (PFPeA)	100	95.7		ng/L		96	71 - 131	6	30
Perfluorohexanoic acid (PFHxA)	100	96.8		ng/L		97	73 - 133	5	30
Perfluoroheptanoic acid (PFHpA)	100	96.5		ng/L		97	72 - 132	2	30
Perfluorooctanoic acid (PFOA)	100	99.2		ng/L		99	70 - 130	2	30
Perfluorononanoic acid (PFNA)	100	107		ng/L		107	75 - 135	1	30
Perfluorodecanoic acid (PFDA)	100	111		ng/L		111	76 - 136	0	30

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QC Sample Results

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

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

Lab Sample ID: LCSD 320-673229/3-A

Matrix: Water

Analysis Batch: 679114

Client Sample ID: Lab Control Sample Dup

Prep Type: Pre-Treatment

Prep Batch: 673229

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluoroundecanoic acid (PFUnA)	100	110		ng/L		110	68 - 128	3	30
Perfluorododecanoic acid (PFDoA)	100	97.1		ng/L		97	71 - 131	3	30
Perfluorotridecanoic acid (PFTrDA)	100	90.4		ng/L		90	71 - 131	0	30
Perfluorotetradecanoic acid (PFTeA)	100	81.2		ng/L		81	70 - 130	6	30
Perfluorobutanesulfonic acid (PFBS)	88.8	96.8		ng/L		109	67 - 127	4	30
Perfluoropentanesulfonic acid (PFPeS)	94.0	113		ng/L		120	66 - 126	9	30
Perfluorohexanesulfonic acid (PFHxS)	91.2	86.4		ng/L		95	59 - 119	5	30
Perfluoroheptanesulfonic acid (PFHpS)	95.4	110		ng/L		115	76 - 136	8	30
Perfluorooctanesulfonic acid (PFOS)	93.0	93.2		ng/L		100	70 - 130	1	30
Perfluorononanesulfonic acid (PFNS)	96.2	95.8		ng/L		100	75 - 135	4	30
Perfluorodecanesulfonic acid (PFDS)	96.4	95.5		ng/L		99	71 - 131	2	30
Perfluorododecanesulfonic acid (PFDoS)	97.0	77.0		ng/L		79	67 - 127	6	30
Perfluorooctanesulfonamide (FOSA)	100	101		ng/L		101	73 - 133	6	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	103		ng/L		103	76 - 136	2	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	92.3		ng/L		92	76 - 136	2	30
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	103		ng/L		109	79 - 139	3	30
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	103		ng/L		108	59 - 175	11	30
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	94.7		ng/L		99	75 - 135	10	30
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	31.6	*- *1	ng/L		32	78 - 138	37	30
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	51.2	*-	ng/L		51	67 - 154	8	30
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	31.3	*- *1	ng/L		31	70 - 130	34	30
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	26.4	*-	ng/L		26	71 - 131	30	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	98.5		ng/L		99	51 - 173	4	30
9CI-PF3ONS	93.4	95.4		ng/L		102	75 - 135	3	30
11CI-PF3OUdS	94.4	85.5		ng/L		91	54 - 114	3	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	101		ng/L		107	79 - 139	6	30
3:3 FTCA	100	92.7		ng/L		93	70 - 130	7	30
5:3 FTCA	100	117		ng/L		117	70 - 130	1	30
7:3 FTCA	100	119		ng/L		119	70 - 130	2	30
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	97.1		ng/L		97	70 - 130	0	30

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QC Sample Results

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

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

Lab Sample ID: LCSD 320-673229/3-A

Matrix: Water

Analysis Batch: 679114

Client Sample ID: Lab Control Sample Dup

Prep Type: Pre-Treatment

Prep Batch: 673229

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	104		ng/L		104	70 - 130	0	30
6:2 FTUCA	100	96.8		ng/L		97	70 - 130	11	30
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	98.9		ng/L		99	70 - 130	5	30
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	89.2	96.7		ng/L		108	70 - 130	1	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
13C8 FOSA	105		25 - 150
13C4 PFBA	103		25 - 150
13C5 PFPeA	104		25 - 150
13C2 PFHxA	108		25 - 150
13C4 PFHpA	115		25 - 150
13C4 PFOA	113		25 - 150
13C5 PFNA	111		25 - 150
13C2 PFDA	115		25 - 150
13C2 PFUnA	113		25 - 150
13C2 PFDoA	118		25 - 150
13C2 PFTeDA	112		25 - 150
13C3 PFBS	102		25 - 150
18O2 PFHxS	121		25 - 150
13C4 PFOS	111		25 - 150
d3-NMeFOSAA	104		25 - 150
d5-NEtFOSAA	111		25 - 150
M2-4:2 FTS	112		25 - 150
13C2 6:2 FTS	125		25 - 150
13C2 8:2 FTS	167	*5+	25 - 150
d-N-MeFOSA-M	62		25 - 150
d-N-EtFOSA-M	46		25 - 150
d7-N-MeFOSE-M	20	*5-	25 - 150
d9-N-EtFOSE-M	18	*5-	25 - 150
13C3 HFPO-DA	106		25 - 150
13C-6:2 FTCA	76		25 - 150
13C-8:2 FTCA	79		25 - 150
13C-6:2 FTUCA	107		25 - 150

Lab Sample ID: MB 320-673494/1-A

Matrix: Water

Analysis Batch: 683172

Client Sample ID: Method Blank

Prep Type: Post-Treatment

Prep Batch: 673494

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	30.0		13		ng/L		05/10/23 07:59	06/14/23 00:13	1
Perfluoropentanoic acid (PFPeA)	42.8		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
Perfluorohexanoic acid (PFHxA)	16.3		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
Perfluoroheptanoic acid (PFHpA)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
Perfluorooctanoic acid (PFOA)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
Perfluorononanoic acid (PFNA)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
Perfluorodecanoic acid (PFDA)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
Perfluoroundecanoic acid (PFUnA)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1

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QC Sample Results

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

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

Lab Sample ID: MB 320-673494/1-A

Matrix: Water

Analysis Batch: 683172

Client Sample ID: Method Blank

Prep Type: Post-Treatment

Prep Batch: 673494

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorododecanoic acid (PFDoA)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
Perfluorotridecanoic acid (PFTTrDA)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
Perfluorotetradecanoic acid (PFTeA)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
Perfluorobutanesulfonic acid (PFBS)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
Perfluoropentanesulfonic acid (PFPeS)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
Perfluorohexanesulfonic acid (PFHxS)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
Perfluorooctanesulfonic acid (PFOS)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
Perfluorononanesulfonic acid (PFNS)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
Perfluorodecanesulfonic acid (PFDS)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
Perfluorododecanesulfonic acid (PFDoS)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
Perfluorooctanesulfonamide (FOSA)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		13		ng/L		05/10/23 07:59	06/14/23 00:13	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		13		ng/L		05/10/23 07:59	06/14/23 00:13	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		13		ng/L		05/10/23 07:59	06/14/23 00:13	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		10		ng/L		05/10/23 07:59	06/14/23 00:13	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		10		ng/L		05/10/23 07:59	06/14/23 00:13	1
9Cl-PF3ONS	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
11Cl-PF3OUs	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
3:3 FTCA	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
5:3 FTCA	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
7:3 FTCA	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
6:2 FTUCA	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		5.0		ng/L		05/10/23 07:59	06/14/23 00:13	1

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QC Sample Results

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

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

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	101		25 - 150	05/10/23 07:59	06/14/23 00:13	1
13C4 PFBA	58		25 - 150	05/10/23 07:59	06/14/23 00:13	1
13C5 PFPeA	94		25 - 150	05/10/23 07:59	06/14/23 00:13	1
13C2 PFHxA	91		25 - 150	05/10/23 07:59	06/14/23 00:13	1
13C4 PFHpA	97		25 - 150	05/10/23 07:59	06/14/23 00:13	1
13C4 PFOA	97		25 - 150	05/10/23 07:59	06/14/23 00:13	1
13C5 PFNA	94		25 - 150	05/10/23 07:59	06/14/23 00:13	1
13C2 PFDA	100		25 - 150	05/10/23 07:59	06/14/23 00:13	1
13C2 PFUnA	105		25 - 150	05/10/23 07:59	06/14/23 00:13	1
13C2 PFDoA	90		25 - 150	05/10/23 07:59	06/14/23 00:13	1
13C2 PFTeDA	89		25 - 150	05/10/23 07:59	06/14/23 00:13	1
13C3 PFBS	97		25 - 150	05/10/23 07:59	06/14/23 00:13	1
18O2 PFHxS	100		25 - 150	05/10/23 07:59	06/14/23 00:13	1
13C4 PFOS	90		25 - 150	05/10/23 07:59	06/14/23 00:13	1
d3-NMeFOSAA	96		25 - 150	05/10/23 07:59	06/14/23 00:13	1
d5-NEtFOSAA	94		25 - 150	05/10/23 07:59	06/14/23 00:13	1
M2-4:2 FTS	0		0 - 10	05/10/23 07:59	06/14/23 00:13	1
13C2 6:2 FTS	107		25 - 150	05/10/23 07:59	06/14/23 00:13	1
13C2 8:2 FTS	117		25 - 150	05/10/23 07:59	06/14/23 00:13	1
d-N-MeFOSA-M	90		25 - 150	05/10/23 07:59	06/14/23 00:13	1
d-N-EtFOSA-M	79		25 - 150	05/10/23 07:59	06/14/23 00:13	1
d7-N-MeFOSE-M	83		25 - 150	05/10/23 07:59	06/14/23 00:13	1
d9-N-EtFOSE-M	75		25 - 150	05/10/23 07:59	06/14/23 00:13	1
13C3 HFPO-DA	88		25 - 150	05/10/23 07:59	06/14/23 00:13	1
13C-6:2 FTCA	105		25 - 150	05/10/23 07:59	06/14/23 00:13	1
13C-8:2 FTCA	109		25 - 150	05/10/23 07:59	06/14/23 00:13	1
13C-6:2 FTUCA	92		25 - 150	05/10/23 07:59	06/14/23 00:13	1

Lab Sample ID: LCS 320-673494/2-A

Matrix: Water

Analysis Batch: 683172

Client Sample ID: Lab Control Sample

Prep Type: Post-Treatment

Prep Batch: 673494

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	100	200	*+	ng/L		200	93 - 153
Perfluoropentanoic acid (PFPeA)	100	225	*+	ng/L		225	85 - 145
Perfluorohexanoic acid (PFHxA)	100	212	*+	ng/L		212	81 - 141
Perfluoroheptanoic acid (PFHpA)	100	191	*+	ng/L		191	104 - 171
Perfluorooctanoic acid (PFOA)	100	326		ng/L		326	158 - 454
Perfluorononanoic acid (PFNA)	100	167	*+	ng/L		167	66 - 126
Perfluorodecanoic acid (PFDA)	100	136	*+	ng/L		136	65 - 125
Perfluoroundecanoic acid (PFUnA)	100	87.2		ng/L		87	57 - 117
Perfluorododecanoic acid (PFDoA)	100	89.9		ng/L		90	66 - 126
Perfluorotridecanoic acid (PFTTrDA)	100	79.8		ng/L		80	65 - 136
Perfluorotetradecanoic acid (PFTeA)	100	63.3		ng/L		63	63 - 123
Perfluorobutanesulfonic acid (PFBS)	88.8	90.6		ng/L		102	75 - 135
Perfluoropentanesulfonic acid (PFPeS)	94.0	91.6		ng/L		97	70 - 130
Perfluorohexanesulfonic acid (PFHxS)	91.2	90.5		ng/L		99	64 - 124

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QC Sample Results

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

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

Lab Sample ID: LCS 320-673494/2-A

Matrix: Water

Analysis Batch: 683172

Client Sample ID: Lab Control Sample

Prep Type: Post-Treatment

Prep Batch: 673494

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluoroheptanesulfonic acid (PFHpS)	95.4	102		ng/L		107	70 - 131
Perfluorooctanesulfonic acid (PFOS)	93.0	99.4		ng/L		107	68 - 128
Perfluorononanesulfonic acid (PFNS)	96.2	89.3		ng/L		93	70 - 130
Perfluorodecanesulfonic acid (PFDS)	96.4	92.5		ng/L		96	66 - 126
Perfluorododecanesulfonic acid (PFDoS)	97.0	73.9		ng/L		76	67 - 127
Perfluorooctanesulfonamide (FOSA)	100	ND		ng/L		0	0 - 10
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	ND		ng/L		0	0 - 10
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	ND		ng/L		0	0 - 10
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	ND		ng/L		0	0 - 10
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	ND		ng/L		0	0 - 10
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	ND		ng/L		0	0 - 10
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	ND		ng/L		0	0 - 10
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	ND		ng/L		0	0 - 10
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	ND		ng/L		0	0 - 10
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	ND		ng/L		0	0 - 10
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	83.1		ng/L		83	51 - 173
9CI-PF3ONS	93.4	91.7		ng/L		98	75 - 135
11CI-PF3OUdS	94.4	54.1		ng/L		57	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	ND		ng/L		1	0 - 10
3:3 FTCA	100	ND		ng/L		0	0 - 10
5:3 FTCA	100	ND		ng/L		0	0 - 10
7:3 FTCA	100	ND		ng/L		0	0 - 10
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	91.2		ng/L		91	70 - 130
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	89.9		ng/L		90	70 - 130
6:2 FTUCA	100	ND		ng/L		0	0 - 10
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	121		ng/L		121	70 - 130
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	89.2	87.8		ng/L		98	70 - 130

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
13C8 FOSA	99		25 - 150
13C4 PFBA	48		25 - 150
13C5 PFPeA	87		25 - 150
13C2 PFHxA	89		25 - 150

Eurofins Sacramento

QC Sample Results

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

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

Lab Sample ID: LCS 320-673494/2-A

Matrix: Water

Analysis Batch: 683172

Client Sample ID: Lab Control Sample

Prep Type: Post-Treatment

Prep Batch: 673494

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C4 PFHpA	87		25 - 150
13C4 PFOA	87		25 - 150
13C5 PFNA	90		25 - 150
13C2 PFDA	97		25 - 150
13C2 PFUnA	97		25 - 150
13C2 PFDoA	86		25 - 150
13C2 PFTeDA	91		25 - 150
13C3 PFBS	93		25 - 150
18O2 PFHxS	91		25 - 150
13C4 PFOS	87		25 - 150
d3-NMeFOSAA	93		25 - 150
d5-NEtFOSAA	90		25 - 150
M2-4:2 FTS	0		0 - 10
13C2 6:2 FTS	103		25 - 150
13C2 8:2 FTS	112		25 - 150
d-N-MeFOSA-M	78		25 - 150
d-N-EtFOSA-M	75		25 - 150
d7-N-MeFOSE-M	71		25 - 150
d9-N-EtFOSE-M	70		25 - 150
13C3 HFPO-DA	86		25 - 150
13C-6:2 FTCA	100		25 - 150
13C-8:2 FTCA	95		25 - 150
13C-6:2 FTUCA	92		25 - 150

Lab Sample ID: LCSD 320-673494/3-A

Matrix: Water

Analysis Batch: 683172

Client Sample ID: Lab Control Sample Dup

Prep Type: Post-Treatment

Prep Batch: 673494

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA)	100	201	*+	ng/L		201	93 - 153	0	30
Perfluoropentanoic acid (PFPeA)	100	227	*+	ng/L		227	85 - 145	1	30
Perfluorohexanoic acid (PFHxA)	100	219	*+	ng/L		219	81 - 141	3	30
Perfluoroheptanoic acid (PFHpA)	100	201	*+	ng/L		201	104 - 171	5	30
Perfluorooctanoic acid (PFOA)	100	345		ng/L		345	158 - 454	6	30
Perfluorononanoic acid (PFNA)	100	152	*+	ng/L		152	66 - 126	10	30
Perfluorodecanoic acid (PFDA)	100	116		ng/L		116	65 - 125	16	30
Perfluoroundecanoic acid (PFUnA)	100	76.3		ng/L		76	57 - 117	13	30
Perfluorobutanesulfonic acid (PFBS)	88.8	97.3		ng/L		110	75 - 135	7	30
Perfluoropentanesulfonic acid (PFPeS)	94.0	99.4		ng/L		106	70 - 130	8	30
Perfluorohexanesulfonic acid (PFHxS)	91.2	89.8		ng/L		99	64 - 124	1	30
Perfluoroheptanesulfonic acid (PFHpS)	95.4	99.3		ng/L		104	70 - 131	2	30
Perfluorooctanesulfonic acid (PFOS)	93.0	99.8		ng/L		107	68 - 128	0	30
Perfluorononanesulfonic acid (PFNS)	96.2	94.6		ng/L		98	70 - 130	6	30

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QC Sample Results

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

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

Lab Sample ID: LCSD 320-673494/3-A

Matrix: Water

Analysis Batch: 683172

Client Sample ID: Lab Control Sample Dup

Prep Type: Post-Treatment

Prep Batch: 673494

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorodecanesulfonic acid (PFDS)	96.4	93.2		ng/L		97	66 - 126	1	30
Perfluorododecanesulfonic acid (PFDoS)	97.0	70.6		ng/L		73	67 - 127	5	30
Perfluorooctanesulfonamide (FOSA)	100	ND		ng/L		0	0 - 10	NC	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	ND		ng/L		0	0 - 10	NC	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	ND		ng/L		0	0 - 10	NC	30
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	ND		ng/L		0	0 - 10	NC	30
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	ND		ng/L		0	0 - 10	NC	30
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	ND		ng/L		0	0 - 10	NC	30
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	ND		ng/L		0	0 - 10	NC	30
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	ND		ng/L		0	0 - 10	NC	30
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	ND		ng/L		0	0 - 10	NC	30
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	ND		ng/L		0	0 - 10	NC	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	71.6		ng/L		72	51 - 173	15	30
9CI-PF3ONS	93.4	87.3		ng/L		94	75 - 135	5	30
11CI-PF3OUdS	94.4	61.7		ng/L		65	54 - 114	13	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	ND		ng/L		1	0 - 10	4	30
3:3 FTCA	100	ND		ng/L		0	0 - 10	NC	30
5:3 FTCA	100	ND		ng/L		0	0 - 10	NC	30
7:3 FTCA	100	ND		ng/L		0	0 - 10	NC	30
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	83.6		ng/L		84	70 - 130	9	30
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	82.0		ng/L		82	70 - 130	9	30
6:2 FTUCA	100	ND		ng/L		0	0 - 10	NC	30
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	133	*+	ng/L		133	70 - 130	9	30
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	89.2	88.8		ng/L		100	70 - 130	1	30

Isotope Dilution	%Recovery	Qualifier	Limits
13C8 FOSA	100		25 - 150
13C4 PFBA	88		25 - 150
13C5 PFPeA	88		25 - 150
13C2 PFHxA	94		25 - 150
13C4 PFHpA	90		25 - 150
13C4 PFOA	93		25 - 150
13C5 PFNA	96		25 - 150
13C2 PFDA	99		25 - 150
13C2 PFUnA	98		25 - 150

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QC Sample Results

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

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

Lab Sample ID: LCSD 320-673494/3-A

Matrix: Water

Analysis Batch: 683172

Client Sample ID: Lab Control Sample Dup

Prep Type: Post-Treatment

Prep Batch: 673494

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
13C2 PFDoA	97		25 - 150
13C2 PFTeDA	96		25 - 150
13C3 PFBS	94		25 - 150
18O2 PFHxS	98		25 - 150
13C4 PFOS	92		25 - 150
d3-NMeFOSAA	91		25 - 150
d5-NEtFOSAA	99		25 - 150
M2-4:2 FTS	0		0 - 10
13C2 6:2 FTS	109		25 - 150
13C2 8:2 FTS	123		25 - 150
d-N-MeFOSA-M	80		25 - 150
d-N-EtFOSA-M	71		25 - 150
d7-N-MeFOSE-M	77		25 - 150
d9-N-EtFOSE-M	76		25 - 150
13C3 HFPO-DA	90		25 - 150
13C-6:2 FTCA	101		25 - 150
13C-8:2 FTCA	110		25 - 150
13C-6:2 FTUCA	97		25 - 150

QC Association Summary

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

LCMS

Prep Batch: 673229

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-99812-1	RH-AFFF	Pre-Treatment	Water	TOP Pre - Prep	
MB 320-673229/1-A	Method Blank	Pre-Treatment	Water	TOP Pre - Prep	
LCS 320-673229/2-A	Lab Control Sample	Pre-Treatment	Water	TOP Pre - Prep	
LCSD 320-673229/3-A	Lab Control Sample Dup	Pre-Treatment	Water	TOP Pre - Prep	

Prep Batch: 673494

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-99812-1 - DL	RH-AFFF	Post-Treatment	Water	TOP Post Prep	
320-99812-1	RH-AFFF	Post-Treatment	Water	TOP Post Prep	
MB 320-673494/1-A	Method Blank	Post-Treatment	Water	TOP Post Prep	
LCS 320-673494/2-A	Lab Control Sample	Post-Treatment	Water	TOP Post Prep	
LCSD 320-673494/3-A	Lab Control Sample Dup	Post-Treatment	Water	TOP Post Prep	

Analysis Batch: 679114

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-99812-1	RH-AFFF	Pre-Treatment	Water	537 (modified)	673229
MB 320-673229/1-A	Method Blank	Pre-Treatment	Water	537 (modified)	673229
LCS 320-673229/2-A	Lab Control Sample	Pre-Treatment	Water	537 (modified)	673229
LCSD 320-673229/3-A	Lab Control Sample Dup	Pre-Treatment	Water	537 (modified)	673229

Analysis Batch: 683172

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-99812-1	RH-AFFF	Post-Treatment	Water	537 (modified)	673494
MB 320-673494/1-A	Method Blank	Post-Treatment	Water	537 (modified)	673494
LCS 320-673494/2-A	Lab Control Sample	Post-Treatment	Water	537 (modified)	673494
LCSD 320-673494/3-A	Lab Control Sample Dup	Post-Treatment	Water	537 (modified)	673494

Analysis Batch: 683459

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-99812-1 - DL	RH-AFFF	Post-Treatment	Water	537 (modified)	673494

Analysis Batch: 692506

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-99812-1	RH-AFFF	Pre-Treatment	Water	Total PFCA-Sum	

Analysis Batch: 692507

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-99812-1	RH-AFFF	Post-Treatment	Water	Total PFCA-Sum	

Analysis Batch: 692511

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-99812-1	RH-AFFF	Total/NA	Water	Total PFCA-Dif	

Lab Chronicle

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

Client Sample ID: RH-AFFF

Lab Sample ID: 320-99812-1

Date Collected: 04/28/23 12:00

Matrix: Water

Date Received: 05/03/23 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Post-Treatment	Prep	TOP Post Prep			0.000002 mL	10.0 mL	673494	05/10/23 07:59	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	683172	06/14/23 01:54	D1R	EET SAC
Post-Treatment	Prep	TOP Post Prep	DL		0.000002 mL	10.0 mL	673494	05/10/23 07:59	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)	DL	5	1 mL	1 mL	683459	06/15/23 15:16	RS1	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep			0.002 mL	10.0 mL	673229	05/08/23 22:26	JER	EET SAC
Pre-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	679114	05/21/23 04:38	D1R	EET SAC
Total/NA	Analysis	Total PFCA-Dif		1			692511	07/20/23 16:12	MKW	EET SAC
Post-Treatment	Analysis	Total PFCA-Sum		1			692507	07/20/23 16:10	MKW	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			692506	07/20/23 16:07	MKW	EET SAC

Laboratory References:

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

Accreditation/Certification Summary

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

Laboratory: Eurofins Sacramento

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Hawaii	State	<cert No.>	01-29-24
The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.			
Analysis Method	Prep Method	Matrix	Analyte
537 (modified)	TOP Post Prep	Water	11CI-PF3OUdS
537 (modified)	TOP Post Prep	Water	3:3 FTCA
537 (modified)	TOP Post Prep	Water	4,8-Dioxa-3H-perfluorononanoic acid (ADONA)
537 (modified)	TOP Post Prep	Water	4:2 Fluorotelomer sulfonic acid (4:2 FTS)
537 (modified)	TOP Post Prep	Water	5:3 FTCA
537 (modified)	TOP Post Prep	Water	6:2 Fluorotelomer sulfonic acid (6:2 FTS)
537 (modified)	TOP Post Prep	Water	6:2 FTUCA
537 (modified)	TOP Post Prep	Water	7:3 FTCA
537 (modified)	TOP Post Prep	Water	8:2 Fluorotelomer sulfonic acid (8:2 FTS)
537 (modified)	TOP Post Prep	Water	9CI-PF3ONS
537 (modified)	TOP Post Prep	Water	Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)
537 (modified)	TOP Post Prep	Water	N-ethylperfluorooctane sulfonamide (NEtFOSA)
537 (modified)	TOP Post Prep	Water	N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)
537 (modified)	TOP Post Prep	Water	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)
537 (modified)	TOP Post Prep	Water	N-methylperfluorooctane sulfonamide (NMeFOSA)
537 (modified)	TOP Post Prep	Water	N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)
537 (modified)	TOP Post Prep	Water	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)
537 (modified)	TOP Post Prep	Water	Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)
537 (modified)	TOP Post Prep	Water	Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)
537 (modified)	TOP Post Prep	Water	Perfluoro-3-methoxypropanoic acid (PFMPA)
537 (modified)	TOP Post Prep	Water	Perfluoro-4-methoxybutanoic acid (PFMBA)
537 (modified)	TOP Post Prep	Water	Perfluorobutanesulfonic acid (PFBS)
537 (modified)	TOP Post Prep	Water	Perfluorobutanoic acid (PFBA)
537 (modified)	TOP Post Prep	Water	Perfluorodecanesulfonic acid (PFDS)
537 (modified)	TOP Post Prep	Water	Perfluorodecanoic acid (PFDA)
537 (modified)	TOP Post Prep	Water	Perfluorododecanesulfonic acid (PFDoS)
537 (modified)	TOP Post Prep	Water	Perfluorododecanoic acid (PFDoA)
537 (modified)	TOP Post Prep	Water	Perfluoroheptanesulfonic acid (PFHpS)
537 (modified)	TOP Post Prep	Water	Perfluoroheptanoic acid (PFHpA)
537 (modified)	TOP Post Prep	Water	Perfluorohexanesulfonic acid (PFHxS)
537 (modified)	TOP Post Prep	Water	Perfluorohexanoic acid (PFHxA)
537 (modified)	TOP Post Prep	Water	Perfluorononanesulfonic acid (PFNS)
537 (modified)	TOP Post Prep	Water	Perfluorononanoic acid (PFNA)
537 (modified)	TOP Post Prep	Water	Perfluorooctanesulfonamide (FOSA)
537 (modified)	TOP Post Prep	Water	Perfluorooctanesulfonic acid (PFOS)
537 (modified)	TOP Post Prep	Water	Perfluorooctanoic acid (PFOA)

Accreditation/Certification Summary

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

Laboratory: Eurofins Sacramento (Continued)

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.			
Analysis Method	Prep Method	Matrix	Analyte
537 (modified)	TOP Post Prep	Water	Perfluoropentanesulfonic acid (PFPeS)
537 (modified)	TOP Post Prep	Water	Perfluoropentanoic acid (PFPeA)
537 (modified)	TOP Post Prep	Water	Perfluorotetradecanoic acid (PFTeA)
537 (modified)	TOP Post Prep	Water	Perfluorotridecanoic acid (PFTrDA)
537 (modified)	TOP Post Prep	Water	Perfluoroundecanoic acid (PFUnA)
537 (modified)	TOP Pre - Prep	Water	11Cl-PF3OUdS
537 (modified)	TOP Pre - Prep	Water	3:3 FTCA
537 (modified)	TOP Pre - Prep	Water	4,8-Dioxa-3H-perfluorononanoic acid (ADONA)
537 (modified)	TOP Pre - Prep	Water	4:2 Fluorotelomer sulfonic acid (4:2 FTS)
537 (modified)	TOP Pre - Prep	Water	5:3 FTCA
537 (modified)	TOP Pre - Prep	Water	6:2 Fluorotelomer sulfonic acid (6:2 FTS)
537 (modified)	TOP Pre - Prep	Water	6:2 FTUCA
537 (modified)	TOP Pre - Prep	Water	7:3 FTCA
537 (modified)	TOP Pre - Prep	Water	8:2 Fluorotelomer sulfonic acid (8:2 FTS)
537 (modified)	TOP Pre - Prep	Water	9Cl-PF3ONS
537 (modified)	TOP Pre - Prep	Water	Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)
537 (modified)	TOP Pre - Prep	Water	N-ethylperfluorooctane sulfonamide (NEtFOSA)
537 (modified)	TOP Pre - Prep	Water	N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)
537 (modified)	TOP Pre - Prep	Water	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)
537 (modified)	TOP Pre - Prep	Water	N-methylperfluorooctane sulfonamide (NMeFOSA)
537 (modified)	TOP Pre - Prep	Water	N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)
537 (modified)	TOP Pre - Prep	Water	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)
537 (modified)	TOP Pre - Prep	Water	Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)
537 (modified)	TOP Pre - Prep	Water	Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)
537 (modified)	TOP Pre - Prep	Water	Perfluoro-3-methoxypropanoic acid (PFMPA)
537 (modified)	TOP Pre - Prep	Water	Perfluoro-4-methoxybutanoic acid (PFMBA)
537 (modified)	TOP Pre - Prep	Water	Perfluorobutanesulfonic acid (PFBS)
537 (modified)	TOP Pre - Prep	Water	Perfluorobutanoic acid (PFBA)
537 (modified)	TOP Pre - Prep	Water	Perfluorodecanesulfonic acid (PFDS)
537 (modified)	TOP Pre - Prep	Water	Perfluorodecanoic acid (PFDA)
537 (modified)	TOP Pre - Prep	Water	Perfluorododecanesulfonic acid (PFDoS)
537 (modified)	TOP Pre - Prep	Water	Perfluorododecanoic acid (PFDaA)
537 (modified)	TOP Pre - Prep	Water	Perfluoroheptanesulfonic acid (PFHpS)
537 (modified)	TOP Pre - Prep	Water	Perfluoroheptanoic acid (PFHpA)
537 (modified)	TOP Pre - Prep	Water	Perfluorohexanesulfonic acid (PFHxS)
537 (modified)	TOP Pre - Prep	Water	Perfluorohexanoic acid (PFHxA)
537 (modified)	TOP Pre - Prep	Water	Perfluorononanesulfonic acid (PFNS)
537 (modified)	TOP Pre - Prep	Water	Perfluorononanoic acid (PFNA)

Accreditation/Certification Summary

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

Laboratory: Eurofins Sacramento (Continued)

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.			
Analysis Method	Prep Method	Matrix	Analyte
537 (modified)	TOP Pre - Prep	Water	Perfluorooctanesulfonamide (FOSA)
537 (modified)	TOP Pre - Prep	Water	Perfluorooctanesulfonic acid (PFOS)
537 (modified)	TOP Pre - Prep	Water	Perfluorooctanoic acid (PFOA)
537 (modified)	TOP Pre - Prep	Water	Perfluoropentanesulfonic acid (PFPeS)
537 (modified)	TOP Pre - Prep	Water	Perfluoropentanoic acid (PFPeA)
537 (modified)	TOP Pre - Prep	Water	Perfluorotetradecanoic acid (PFTeA)
537 (modified)	TOP Pre - Prep	Water	Perfluorotridecanoic acid (PFTTrDA)
537 (modified)	TOP Pre - Prep	Water	Perfluoroundecanoic acid (PFUnA)
Total PFCA-Dif		Water	PFBA
Total PFCA-Dif		Water	PFHpA
Total PFCA-Dif		Water	PFHxA
Total PFCA-Dif		Water	PFNA
Total PFCA-Dif		Water	PFOA
Total PFCA-Dif		Water	PFPA
Total PFCA-Dif		Water	Total PFCA
Total PFCA-Sum		Water	Total PFCA

Method Summary

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

Method	Method Description	Protocol	Laboratory
537 (modified)	Fluorinated Alkyl Substances	EPA	EET SAC
Total PFCA-Dif	Total PFCA (Treatment Difference)	TAL SOP	EET SAC
Total PFCA-Sum	Total PFCA (Summary)	TAL SOP	EET SAC
TOP Post Prep	Solid-Phase Extraction (SPE)	SW846	EET SAC
TOP Pre - Prep	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.

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

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

Sample Summary

Client: Hawaii Department of Health
Project/Site: Red Hill AFFF

Job ID: 320-99812-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-99812-1	RH-AFFF	Water	04/28/23 12:00	05/03/23 10:00

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880 Riverside Parkway
West Sacramento, CA 95605-1500
phone 916.373.5600 fax 303.467.7222

Chain of Custody Record



Environment Testing
America

Eurofins Environment Testing Northern California, LLC

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Project Manager: Roger Brewer

Client Contact

Roger Brewer HDOH

2385 Waimano Home Rd. Ste 100

Honolulu, HI 96872


(808) 586-4229

Phone

Project Name: Red Hill AFFF

Site: Red Hill, HI

Project ID: 103S864023110.02

Project Manager: Roger Brewer		INVOICE & Lab Report CC:									
		Eric Jensen, Tetra Tech, Inc. eric.jensen@tetratech.com 808.441.4784		Date:						COC No: _____ of _____ COCs	
Email: roger.brewer@doh.hawaii.gov Tel/Fax: 808-586-4229		Lab Contact:		Carrier:		TALS Project #:					
Analysis Turnaround Time <input type="checkbox"/> CALENDAR DAYS <input checked="" type="checkbox"/> WORKING DAYS TAT if different from Below _____ 30 <input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input checked="" type="checkbox"/> 1 day		Filtered Sample (Y / N) Perform MS / MSD (Y / N) Pre-Analysis, Oxidation & Post-Analysis ELLE SOP Adsorbable Organic Fluorine		Sample Specific Notes: Concentrated AFFFF Product (SDS Attached)		 320-99812 Chain of Custody		Sample Specific Notes: Concentrated AFFFF Product (SDS Attached)		Sample Specific Notes: Concentrated AFFFF Product (SDS Attached)	
Sample Identification RH-AFFF		Sample Date Sample Time Sample Type (G=Comp, G=Grab) Matrix # of Cont.		G Liquid 2 N X X		Sample Specific Notes: Concentrated AFFFF Product (SDS Attached)		Sample Specific Notes: Concentrated AFFFF Product (SDS Attached)		Sample Specific Notes: Concentrated AFFFF Product (SDS Attached)	
Preservation Used: 1 Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.		<input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown		<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)					
Special Instructions/QC Requirements & Comments: This is a sample of undiluted, Ansolite AFFFF Concentrate. High PFAS concentrations anticipated. Reports to : DOH (Roger Brewer) roger.brewer@doh.hawaii.gov and Tetra Tech (Eric Jensen) eric.jensen@tetratech.com Invoices to: Tetra Tech (Eric Jensen) eric.jensen@tetratech.com		Custody Seal No.: _____ Relinquished by: _____ Relinquished by: _____ Relinquished by: _____		Cooler Temp. (°C): Obs'd: _____ Received by: _____ Received by: _____ Received in Laboratory by: _____		Corr'd: _____ Date/Time: 5/2/23 12:00 PM Date/Time: 5/3/23 10:00 AM Date/Time: _____		Therm ID No.: _____ Date/Time: _____ Date/Time: _____ Date/Time: _____			

Login Sample Receipt Checklist

Client: Hawaii Department of Health

Job Number: 320-99812-1

Login Number: 99812

List Source: Eurofins Sacramento

List Number: 1

Creator: Pratali, Sandra A

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.	N/A	
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	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
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?	False	
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.	True	
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	