eurofins | Environment Testing

ANALYTICAL REPORT

PREPARED FOR

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

Generated 11/28/2023 3:38:54 PM

JOB DESCRIPTION

DOH Maui Wildfire Ash Sample- KULA

JOB NUMBER

320-105423-1

Eurofins Sacramento
880 Riverside Parkway
West Sacramento CA 95605

See page two for job notes and contact information.

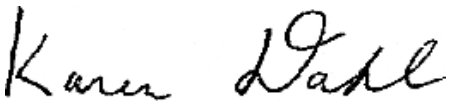
my EOL

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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



Generated
11/28/2023 3:38:54 PM

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

Table of Contents

Definitions/Glossary

Client: Hawaii Department of Health
Job ID: 320-105423-1
Project/Site: DOH Maui Wildfire Ash Sample- KULA

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.
H	Sample was prepped or analyzed beyond the specified holding time. This does not meet regulatory requirements.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
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

Job ID: 320-105423-1

Laboratory: Eurofins Sacramento

Narrative

Receipt
The sample was received on 9/29/2023 9:15 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 8.8º C.

Receipt Exceptions
The following sample was received at the laboratory outside the required temperature criteria: KULA ASH #1 (320-105423-1). Samples were received out of temp at 8.8C. Cold gel packs were present in the cooler.

LCMS
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 320-713655/2-A) and (LCSD 320-713655/3-A)

Method 537 (modified): One Isotope Dilution Analyte (IDA) recovery associated with the following samples is below the method recommended limit: (MB 320-713655/1-A) & (LCSD 320-717648/3-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): The labeled analyte M2-4:2FTS 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. KULA ASH #1 (320-105423-1), (LCS 320-713655/2-A), (LCSD 320-713655/3-A) and (MB 320-713655/1-A)

Method 537 (modified): The laboratory control sample and laboratory control sample duplicate (LCS/LCSD) for preparation batch 320-713655 recovered low outside control limits for the following analytes: Nonafluoro-3,6-dioxaheptanoic acid (NFDHA) and Perfluoro-4-methoxybutanoic acid (PFMBA). Re-analysis confirmed the low recoveries. The recoveries are being compared to the laboratory default limits. As additional data points are collected, the control limits will be updated to reflect the method performance.

Method 537 (modified): The laboratory control sample duplicate (LCSD) for preparation batch 320-713655 recovered low outside control limits for the following analyte: Hexafluoropropylene Oxide Dimer Acid (HFPO-DA/GenX). Re-analysis confirmed the low recovery. The recoveries are being compared to the laboratory default limits. As additional data points are collected, the control limits will be updated to reflect the method performance.

Method 537 (modified): The laboratory control sample duplicate (LCSD) for preparation batch 320-717648 recovered low outside control limits for the following analytes: 3-Perfluoropropylpropanoic acid (3:3 FTCA) and Perfluoro-3-methoxypropanoic acid (PFMPA). Re-analysis confirmed the low recoveries. The recovery is being compared to the laboratory default limits. As additional data points are analyzed, the control limits will be updated to reflect the method performance.

Method 537 (modified): The RPD of the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 320-717648 and analytical batch 320-721268 recovered outside control limits for the following analytes: 3-Perfluoropropylpropanoic acid (3:3 FTCA) and Perfluoro-3-methoxypropanoic acid (PFMPA).

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

Organic Prep
Method TOP Post-Prep/TOP Pre-Prep: The following sample was prepared outside of the preparation holding time due to laboratory delays: KULA ASH #1 (320-105423-1).

Job ID: 320-105423-1 (Continued)

Laboratory: Eurofins Sacramento (Continued)

Methods TOP Pre-Prep: The following sample was re-prepared outside of the preparation holding time due to a low Isotope Dilution analyte (IDA) recovery and low recoveries in the lab control sample and lab control sample duplicate: KULA ASH #1 (320-105423-1). The best data was reported.

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

Detection Summary

Client: Hawaii Department of Health
Job ID: 320-105423-1
Project/Site: DOH Maui Wildfire Ash Sample- KULA

Client Sample ID: KULA ASH #1
Lab Sample ID: 320-105423-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	7.5	H	0.94		ug/Kg	1		537 (modified)	Pre-Treatment
Perfluorobutanoic acid (PFBA)	2.2	H	0.97		ug/Kg	1		537 (modified)	Post-Treatment
Perfluoropentanoic acid (PFPeA)	3.2	H	0.97		ug/Kg	1		537 (modified)	Post-Treatment
Perfluorohexanoic acid (PFHxA)	1.4	H *+	0.97		ug/Kg	1		537 (modified)	Post-Treatment
PFBA	2.2				ug/Kg	1		Total PFCA-Dif	Total/NA
PFPA	3.2				ug/Kg	1		Total PFCA-Dif	Total/NA
PFHxA	1.4				ug/Kg	1		Total PFCA-Dif	Total/NA
PFHpA	0.00				ug/Kg	1		Total PFCA-Dif	Total/NA
PFOA	0.00				ug/Kg	1		Total PFCA-Dif	Total/NA
PFNA	0.00				ug/Kg	1		Total PFCA-Dif	Total/NA
Total PFCA	6.8				ug/Kg	1		Total PFCA-Dif	Total/NA
Total PFCA	0.00				ug/Kg	1		Total PFCA-Sum	Pre-Treatment
Total PFCA	6.8				ug/Kg	1		Total PFCA-Sum	Post-Treatment

This Detection Summary does not include radiochemical test results.

Client: Hawaii Department of Health
Project/Site: DOH Maui Wildfire Ash Sample- KULA

Job ID: 320-105423-1

Client Sample ID: KULA ASH #1
Date Collected: 09/21/23 17:00
Date Received: 09/29/23 09:15

Lab Sample ID: 320-105423-1
Matrix: Solid

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanoic acid (PFPeA)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Perfluorohexanoic acid (PFHxA)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Perfluoroheptanoic acid (PFHpA)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Perfluorooctanoic acid (PFOA)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Perfluorononanoic acid (PFNA)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Perfluorodecanoic acid (PFDA)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Perfluoroundecanoic acid (PFUnA)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Perfluorododecanoic acid (PFDoA)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Perfluorotridecanoic acid (PFTrDA)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Perfluorotetradecanoic acid (PFTeA)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Perfluorobutanesulfonic acid (PFBS)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Perfluoropentanesulfonic acid (PFPeS)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Perfluorohexanesulfonic acid (PFHxS)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Perfluoroheptanesulfonic acid (PFHpS)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Perfluorooctanesulfonic acid (PFOS)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Perfluorononanesulfonic acid (PFNS)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Perfluorodecanesulfonic acid (PFDS)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Perfluorododecanesulfonic acid (PFDoS)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Perfluorooctanesulfonamide (FOSA)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
N-Methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	**7.5**	**H**	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
1H,1H,2H,2H-Perfluorododecane sulfonic acid (10:2 FTS)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA/GenX)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
3-Perfluoropentylpropanoic acid (5:3 FTCA)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
3-Perfluoroheptylpropanoic acid (7:3 FTCA)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1

Client: Hawaii Department of Health
Job ID: 320-105423-1
Project/Site: DOH Maui Wildfire Ash Sample- KULA

Client Sample ID: KULA ASH #1
Lab Sample ID: 320-105423-1
Date Collected: 09/21/23 17:00
Matrix: Solid
Date Received: 09/29/23 09:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFECHS	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
PFPrS	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
6:2 FTUCA	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND	H	0.94		ug/Kg		10/16/23 18:20	10/29/23 16:10	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*90*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
13C5 PFPeA	*71*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
13C2 PFHxA	*96*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
13C4 PFHpA	*102*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
13C4 PFOA	*100*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
13C5 PFNA	*95*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
13C2 PFDA	*99*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
13C2 PFUnA	*100*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
13C2 PFDoA	*91*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
13C2 PFTeDA	*80*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
13C2 PFHxDA	*42*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
13C3 PFBS	*85*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
18O2 PFHxS	*91*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
13C4 PFOS	*79*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
d5-NEtFOSAA	*91*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
d3-NMeFOSAA	*88*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
M2-4:2 FTS	*103*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
M2-6:2 FTS	*102*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
M2-8:2 FTS	*112*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
d-N-MeFOSA-M	*85*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
d-N-EtFOSA-M	*85*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
d7-N-MeFOSE-M	*79*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
d9-N-EtFOSE-M	*77*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
13C3 HFPO-DA	*101*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
13C-6:2 FTCA	*67*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
13C-8:2 FTCA	*70*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
13C2 10:2 FTS	*111*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*
13C-6:2 FTUCA	*121*		*25 - 150*	*10/16/23 18:20*	*10/29/23 16:10*	*1*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND	H	0.94		ug/Kg		11/02/23 21:31	11/18/23 05:37	1
Perfluoro-n-octadecanoic acid (PFODA)	ND	H	0.94		ug/Kg		11/02/23 21:31	11/18/23 05:37	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	H	0.94		ug/Kg		11/02/23 21:31	11/18/23 05:37	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	H	0.94		ug/Kg		11/02/23 21:31	11/18/23 05:37	1
3-Perfluoropropylpropanoic acid (3:3 FTCA)	ND	H *- *1	0.94		ug/Kg		11/02/23 21:31	11/18/23 05:37	1

Client Sample ID: KULA ASH #1
Date Collected: 09/21/23 17:00
Date Received: 09/29/23 09:15

Lab Sample ID: 320-105423-1
Matrix: Solid

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	H *- *1	0.94		ug/Kg		11/02/23 21:31	11/18/23 05:37	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*93*		*25 - 150*	*11/02/23 21:31*	*11/18/23 05:37*	*1*
13C5 PFPeA	*94*		*25 - 150*	*11/02/23 21:31*	*11/18/23 05:37*	*1*
13C3 PFBS	*89*		*25 - 150*	*11/02/23 21:31*	*11/18/23 05:37*	*1*
d-N-MeFOSA-M	*70*		*25 - 150*	*11/02/23 21:31*	*11/18/23 05:37*	*1*
d-N-EtFOSA-M	*78*		*25 - 150*	*11/02/23 21:31*	*11/18/23 05:37*	*1*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**2.2**	**H**	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Perfluoropentanoic acid (PFPeA)	**3.2**	**H**	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Perfluorohexanoic acid (PFHxA)	**1.4**	**H *+**	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Perfluoroheptanoic acid (PFHpA)	ND	H *+	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Perfluorooctanoic acid (PFOA)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Perfluorononanoic acid (PFNA)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Perfluorodecanoic acid (PFDA)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Perfluoroundecanoic acid (PFUnA)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Perfluorododecanoic acid (PFDoA)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Perfluorotridecanoic acid (PFTrDA)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Perfluorotetradecanoic acid (PFTeA)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Perfluorobutanesulfonic acid (PFBS)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Perfluoropentanesulfonic acid (PFPeS)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Perfluorohexanesulfonic acid (PFHxS)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Perfluoroheptanesulfonic acid (PFHpS)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Perfluorooctanesulfonic acid (PFOS)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Perfluorononanesulfonic acid (PFNS)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Perfluorodecanesulfonic acid (PFDS)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Perfluorododecanesulfonic acid (PFDoS)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Perfluorooctanesulfonamide (FOSA)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
N-Methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1

Client: Hawaii Department of Health
Project/Site: DOH Maui Wildfire Ash Sample- KULA

Job ID: 320-105423-1

Client Sample ID: KULA ASH #1
Date Collected: 09/21/23 17:00
Date Received: 09/29/23 09:15

Lab Sample ID: 320-105423-1
Matrix: Solid

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA/GenX)	ND	H *-	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
3-Perfluoropropylpropanoic acid (3:3 FTCA)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
3-Perfluoropentylpropanoic acid (5:3 FTCA)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
3-Perfluoroheptylpropanoic acid (7:3 FTCA)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
6:2 FTUCA	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	H *-	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND	H *-	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND	H	0.97		ug/Kg		10/16/23 18:05	10/29/23 11:54	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*87*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
13C4 PFBA	*33*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
13C5 PFPeA	*93*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
13C2 PFHxA	*97*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
13C4 PFHpA	*94*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
13C4 PFOA	*95*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
13C5 PFNA	*93*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
13C2 PFDA	*95*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
13C2 PFUnA	*86*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
13C2 PFDoA	*81*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
13C2 PFTeDA	*85*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
13C2 PFHxDA	*91*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
13C3 PFBS	*83*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
18O2 PFHxS	*91*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
13C4 PFOS	*76*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
d5-NEtFOSAA	*89*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
d3-NMeFOSAA	*83*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
M2-4:2 FTS	*0*		*0 - 10*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
M2-6:2 FTS	*99*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
M2-8:2 FTS	*101*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
d-N-MeFOSA-M	*74*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
d-N-EtFOSA-M	*78*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
d7-N-MeFOSE-M	*79*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
d9-N-EtFOSE-M	*78*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
13C3 HFPO-DA	*95*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
13C-6:2 FTCA	*67*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*

Client: Hawaii Department of Health
Project/Site: DOH Maui Wildfire Ash Sample- KULA

Job ID: 320-105423-1

Client Sample ID: KULA ASH #1

Date Collected: 09/21/23 17:00
Date Received: 09/29/23 09:15

Lab Sample ID: 320-105423-1

Matrix: Solid

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

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-8:2 FTCA	*71*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
13C2 10:2 FTS	*112*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*
13C-6:2 FTUCA	*119*		*25 - 150*	*10/16/23 18:05*	*10/29/23 11:54*	*1*

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

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	**2.2**				ug/Kg			11/21/23 14:21	1
PFPA	**3.2**				ug/Kg			11/21/23 14:21	1
PFHxA	**1.4**				ug/Kg			11/21/23 14:21	1
PFHpA	**0.00**				ug/Kg			11/21/23 14:21	1
PFOA	**0.00**				ug/Kg			11/21/23 14:21	1
PFNA	**0.00**				ug/Kg			11/21/23 14:21	1
Total PFCA	**6.8**				ug/Kg			11/21/23 14:21	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	**0.00**				ug/Kg			11/18/23 05:37	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	**6.8**				ug/Kg			10/29/23 11:54	1

November 27, 2023

Hawaii Department of Health
919 Ala Moana Blvd
Room 206
Honolulu, HI 96814

Attn: Roger Brewer

RE: PFAS by NTA Results for Eurofins Job 320-105423-1

Dear Mr. Brewer,

Enclosed are the Non-Target Analysis (NTA) results for potential PFAS parameters in the one solid sample submitted to Eurofins in Job 320-105423-1. Client and laboratory sample IDs are as follows: KULA ASH #1 (320-105423-1). 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 are typically applied to aqueous samples. The NTA determination uses high resolution mass spectrometry (HRMS) to identify potential PFAS parameters but inherently incurs an increased level of uncertainty and certified reference standards are not used to confirm reported results.

There were no non-target analytes identified as potential PFAS parameters in this sample in either positive or negative ionization modes and associated SWATH HRMS acquisitions.

Sample Preparation

For sample KULA ASH #1 (320-105423-1), a 10 g aliquot of the solid sample was extracted using the laboratory work instruction for solid samples from Hawaii DOH. A 2.5 ml subsample of the resulting extract (0.5 g sample equivalent) was neutralized, diluted to 5 ml at final composition of 50:50 MeOH/Water, and a 300 ul aliquot of the diluted sample (1 g -> 10 ml) was filtered into an LC/MS injection vial for analysis by LC-QTOF MS.

Sample Analysis

The sample extracts were 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.

As noted above, no positive identifications for any PFAS parameter were generated via the sample preparation, analyses, and data processing procedures described above.

Please do not hesitate to let us know if there are any questions.

Total Oxidation Precursors

Client: Hawaii Department of Health
Project/Site: DOH Maui Wildfire Ash Sample- KULA

TestAmerica Job ID: 320-105423-1

Client Sample ID: KULA ASH #1

Lab Sample ID: 320-105423-1
Matrix: Solid

	Pre-Treatment Method			Post-Treatment Method			Difference [1]	
	537 (modified)			537 (modified)				
Analyte	**Result**	**Qualifier**	**Unit**	**Result**	**Qualifier**	**Unit**	**Result**	**Unit**
Perfluorobutanoic acid (PFBA)	ND		ug/Kg	2.2		ug/Kg	2.2	ug/Kg
Perfluoropentanoic acid (PFPeA)	ND		ug/Kg	3.2		ug/Kg	3.2	ug/Kg
Perfluorohexanoic acid (PFHxA)	ND		ug/Kg	1.4		ug/Kg	1.4	ug/Kg
Perfluoroheptanoic acid (PFHpA)	ND		ug/Kg	ND		ug/Kg	0.00	ug/Kg
Perfluorooctanoic acid (PFOA)	ND		ug/Kg	ND		ug/Kg	0.00	ug/Kg
Perfluorononanoic acid (PFNA)	ND		ug/Kg	ND		ug/Kg	0.00	ug/Kg
Total PFCA	0.00		ug/Kg	6.8		ug/Kg	6.8	ug/Kg

[1] Difference = Post-Treatment - Pre-Treament

Isotope Dilution Summary

Client: Hawaii Department of Health
Project/Site: DOH Maui Wildfire Ash Sample- KULA

Job ID: 320-105423-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Solid

Prep Type: Pre-Treatment

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFOSA	PFPeA	PFHxA	C4PFHA	PFOA	PFNA	PFDA	PFUnA
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
320-105423-1	KULA ASH #1	90	71	96	102	100	95	99	100
LCS 320-713658/2-A	Lab Control Sample	83	42	92	94	92	91	98	91
LCSD 320-713658/3-A	Lab Control Sample Dup	90	52	93	96	95	90	96	102
MB 320-713658/1-A	Method Blank	84	25	90	91	98	90	99	95

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFDoA	PFTDA	PFHxDA	C3PFBS	PFHxS	PFOS	d5NEFOS	d3NMFOS
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
320-105423-1	KULA ASH #1	91	80	42	85	91	79	91	88
LCS 320-713658/2-A	Lab Control Sample	90	81	63	81	84	79	92	86
LCSD 320-713658/3-A	Lab Control Sample Dup	97	91	72	83	86	83	96	91
MB 320-713658/1-A	Method Blank	93	85	65	81	88	79	94	82

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		M242FTS	M262FTS	M282FTS	dMeFOSA	dEtFOSA	NMFM	NEFM	HFPODA
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
320-105423-1	KULA ASH #1	103	102	112	85	85	79	77	101
LCS 320-713658/2-A	Lab Control Sample	92	98	100	78	82	77	76	97
LCSD 320-713658/3-A	Lab Control Sample Dup	89	94	103	83	84	81	82	101
MB 320-713658/1-A	Method Blank	83	103	103	80	73	77	75	90

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		MFHEA	MFOEA	M102FTS	MFHUEA				
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)				
320-105423-1	KULA ASH #1	67	70	111	121				
LCS 320-713658/2-A	Lab Control Sample	61	67	105	118				
LCSD 320-713658/3-A	Lab Control Sample Dup	68	69	110	121				
MB 320-713658/1-A	Method Blank	64	64	105	118				

Surrogate Legend

PFOSA = 13C8 FOSA
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
d5NEFOS = d5-NEtFOSAA
d3NMFOS = d3-NMeFOSAA
M242FTS = M2-4:2 FTS
M262FTS = M2-6:2 FTS
M282FTS = M2-8:2 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
M102FTS = 13C2 10:2 FTS
MFHUEA = 13C-6:2 FTUCA

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Solid **Prep Type: Pre-Treatment**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFBA (25-150)	PFPeA (25-150)	C3PFBS (25-150)	dMeFOSA (25-150)	dEtFOSA (25-150)			
320-105423-1 - RE	KULA ASH #1	93	94	89	70	78			

Surrogate Legend
PFBA = 13C4 PFBA
PFPeA = 13C5 PFPeA
C3PFBS = 13C3 PFBS
dMeFOSA = d-N-MeFOSA-M
dEtFOSA = d-N-EtFOSA-M

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Solid **Prep Type: Pre-Treatment**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFBA (25-150)	PFPeA (25-150)	PFHxDA (25-150)	C3PFBS (25-150)	dMeFOSA (25-150)	dEtFOSA (25-150)		
LCS 320-717648/2-A - RE	Lab Control Sample	56	96	100	90	81	94		
LCSD 320-717648/3-A - RE	Lab Control Sample Dup	19 *5-	78	86	87	101	96		
MB 320-717648/1-A - RE	Method Blank	90	95	107	94	76	92		

Surrogate Legend
PFBA = 13C4 PFBA
PFPeA = 13C5 PFPeA
PFHxDA = 13C2 PFHxDA
C3PFBS = 13C3 PFBS
dMeFOSA = d-N-MeFOSA-M
dEtFOSA = d-N-EtFOSA-M

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Solid **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)
320-105423-1	KULA ASH #1	87	33	93	97	94	95	93	95
LCS 320-713655/2-A	Lab Control Sample	90	35	96	93	102	97	98	103
LCSD 320-713655/3-A	Lab Control Sample Dup	94	41	102	96	102	97	96	100
MB 320-713655/1-A	Method Blank	92	22 *5-	94	94	102	100	94	99

		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)	d5NEFOS (25-150)
320-105423-1	KULA ASH #1	86	81	85	91	83	91	76	89
LCS 320-713655/2-A	Lab Control Sample	98	101	97	80	86	96	86	94
LCSD 320-713655/3-A	Lab Control Sample Dup	101	93	99	87	89	95	90	96
MB 320-713655/1-A	Method Blank	95	90	93	84	89	96	90	101

Isotope Dilution Summary

Client: Hawaii Department of Health
Job ID: 320-105423-1
Project/Site: DOH Maui Wildfire Ash Sample- KULA

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

Matrix: Solid
Prep Type: Post-Treatment

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	d3NMFOS (25-150)	M242FTS (0-10)	M262FTS (25-150)	M282FTS (25-150)	dMeFOSA (25-150)	dEtFOSA (25-150)	NMFM (25-150)	NEFM (25-150)
320-105423-1	KULA ASH #1	83	0	99	101	74	78	79	78
LCS 320-713655/2-A	Lab Control Sample	94	0	104	114	79	83	85	76
LCSD 320-713655/3-A	Lab Control Sample Dup	92	0	103	100	84	82	89	77
MB 320-713655/1-A	Method Blank	86	0	100	109	80	84	79	77

		Percent Isotope Dilution Recovery (Acceptance Limits)				
Lab Sample ID	Client Sample ID	HFPODA (25-150)	MFHEA (25-150)	MFOEA (25-150)	M102FTS (25-150)	MFHUEA (25-150)
320-105423-1	KULA ASH #1	95	67	71	112	119
LCS 320-713655/2-A	Lab Control Sample	105	71	73	106	130
LCSD 320-713655/3-A	Lab Control Sample Dup	99	71	73	108	130
MB 320-713655/1-A	Method Blank	101	69	64	100	117

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
d5NEFOS = d5-NEtFOSAA
d3NMFOS = d3-NMeFOSAA
M242FTS = M2-4:2 FTS
M262FTS = M2-6:2 FTS
M282FTS = M2-8:2 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
M102FTS = 13C2 10:2 FTS
MFHUEA = 13C-6:2 FTUCA

Client: Hawaii Department of Health
Project/Site: DOH Maui Wildfire Ash Sample- KULA

Job ID: 320-105423-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-713658/1-A
Matrix: Solid
Analysis Batch: 716642

Client Sample ID: Method Blank
Prep Type: Pre-Treatment
Prep Batch: 713658

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanoic acid (PFPeA)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Perfluorohexanoic acid (PFHxA)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Perfluoroheptanoic acid (PFHpA)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Perfluorooctanoic acid (PFOA)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Perfluorononanoic acid (PFNA)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Perfluorodecanoic acid (PFDA)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Perfluoroundecanoic acid (PFUnA)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Perfluorododecanoic acid (PFDoA)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Perfluorotridecanoic acid (PFTrDA)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Perfluorononanesulfonic acid (PFNS)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Perfluorododecanesulfonic acid (PFDoS)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Perfluorooctanesulfonamide (FOSA)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
N-Methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
1H,1H,2H,2H-Perfluorododecane sulfonic acid (10:2 FTS)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA/GenX)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
3-Perfluoropentylpropanoic acid (5:3 FTCA)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1

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

Lab Sample ID: MB 320-713658/1-A
Matrix: Solid
Analysis Batch: 716642

Client Sample ID: Method Blank
Prep Type: Pre-Treatment
Prep Batch: 713658

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
3-Perfluoroheptylpropanoic acid (7:3 FTCA)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
PFECHS	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
PFPrS	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
6:2 FTUCA	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND		1.0		ug/Kg		10/16/23 18:20	10/29/23 15:14	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*84*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
13C5 PFPeA	*25*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
13C2 PFHxA	*90*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
13C4 PFHpA	*91*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
13C4 PFOA	*98*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
13C5 PFNA	*90*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
13C2 PFDA	*99*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
13C2 PFUnA	*95*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
13C2 PFDoA	*93*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
13C2 PFTeDA	*85*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
13C2 PFHxDA	*65*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
13C3 PFBS	*81*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
18O2 PFHxS	*88*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
13C4 PFOS	*79*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
d5-NEtFOSAA	*94*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
d3-NMeFOSAA	*82*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
M2-4:2 FTS	*83*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
M2-6:2 FTS	*103*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
M2-8:2 FTS	*103*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
d-N-MeFOSA-M	*80*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
d-N-EtFOSA-M	*73*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
d7-N-MeFOSE-M	*77*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
d9-N-EtFOSE-M	*75*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
13C3 HFPO-DA	*90*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
13C-6:2 FTCA	*64*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
13C-8:2 FTCA	*64*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
13C2 10:2 FTS	*105*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*
13C-6:2 FTUCA	*118*		*25 - 150*	*10/16/23 18:20*	*10/29/23 15:14*	*1*

Lab Sample ID: LCS 320-713658/2-A
Matrix: Solid
Analysis Batch: 716642

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 713658

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluoropentanoic acid (PFPeA)	10.0	10.9		ug/Kg		109	69 - 129
Perfluorohexanoic acid (PFHxA)	10.0	10.3		ug/Kg		103	71 - 131
Perfluoroheptanoic acid (PFHpA)	10.0	10.6		ug/Kg		106	71 - 131

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

Lab Sample ID: LCS 320-713658/2-A
Matrix: Solid
Analysis Batch: 716642

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 713658

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorooctanoic acid (PFOA)	10.0	10.8		ug/Kg		108	72 - 132
Perfluorononanoic acid (PFNA)	10.0	10.4		ug/Kg		104	73 - 133
Perfluorodecanoic acid (PFDA)	10.0	9.72		ug/Kg		97	72 - 132
Perfluoroundecanoic acid (PFUnA)	10.0	10.2		ug/Kg		102	66 - 126
Perfluorododecanoic acid (PFDoA)	10.0	10.1		ug/Kg		101	71 - 131
Perfluorotridecanoic acid (PFTrDA)	10.0	9.95		ug/Kg		99	71 - 131
Perfluorotetradecanoic acid (PFTeA)	10.0	10.1		ug/Kg		101	67 - 127
Perfluoro-n-hexadecanoic acid (PFHxDA)	10.0	10.3		ug/Kg		103	75 - 135
Perfluorobutanesulfonic acid (PFBS)	8.88	10.1		ug/Kg		113	69 - 129
Perfluoropentanesulfonic acid (PFPeS)	9.40	10.3		ug/Kg		110	66 - 126
Perfluorohexanesulfonic acid (PFHxS)	9.12	9.66		ug/Kg		106	62 - 122
Perfluoroheptanesulfonic acid (PFHpS)	9.54	11.2		ug/Kg		117	76 - 136
Perfluorooctanesulfonic acid (PFOS)	9.30	9.70		ug/Kg		104	68 - 141
Perfluorononanesulfonic acid (PFNS)	9.62	11.1		ug/Kg		115	72 - 132
Perfluorodecanesulfonic acid (PFDS)	9.64	10.5		ug/Kg		109	71 - 131
Perfluorododecanesulfonic acid (PFDoS)	9.70	9.90		ug/Kg		102	70 - 130
Perfluorooctanesulfonamide (FOSA)	10.0	9.88		ug/Kg		99	77 - 137
N-Methyl perfluorooctanesulfonamidoaceti c acid (NMeFOSAA)	10.0	10.7		ug/Kg		107	72 - 132
N-Ethyl perfluorooctanesulfonamidoaceti c acid (NEtFOSAA)	10.0	9.69		ug/Kg		97	72 - 132
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	9.38	11.4		ug/Kg		122	68 - 143
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	9.52	9.84		ug/Kg		103	73 - 139
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	9.60	10.1		ug/Kg		105	75 - 135
1H,1H,2H,2H-Perfluorododecane sulfonic acid (10:2 FTS)	9.66	9.03		ug/Kg		93	69 - 145
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	10.0	7.92		ug/Kg		79	43 - 153
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	10.0	7.56		ug/Kg		76	44 - 155
9-Chlorohexadecafluoro-3-oxan onane-1-sulfonic acid (9Cl-PF3ONS)	9.34	11.3		ug/Kg		120	74 - 134
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA/GenX)	10.0	10.4		ug/Kg		104	53 - 158

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

Lab Sample ID: LCS 320-713658/2-A
Matrix: Solid
Analysis Batch: 716642

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 713658

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	9.44	10.4		ug/Kg		110	66 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	9.46	11.4		ug/Kg		121	79 - 139
3-Perfluoropentylpropanoic acid (5:3 FTCA)	10.0	14.4		ug/Kg		144	50 - 150
3-Perfluoroheptylpropanoic acid (7:3 FTCA)	10.0	14.1		ug/Kg		141	50 - 150
PFECHS	9.24	9.08		ug/Kg		98	50 - 150
PFPrS	9.20	9.61		ug/Kg		105	50 - 150
6:2 FTUCA	10.0	12.6		ug/Kg		126	50 - 150
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	10.0	10.1		ug/Kg		101	50 - 150
Perfluoro-4-methoxybutanoic acid (PFMBA)	10.0	14.9		ug/Kg		149	50 - 150
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	8.92	9.44		ug/Kg		106	50 - 150

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C8 FOSA	*83*		*25 - 150*
13C5 PFPeA	*42*		*25 - 150*
13C2 PFHxA	*92*		*25 - 150*
13C4 PFHpA	*94*		*25 - 150*
13C4 PFOA	*92*		*25 - 150*
13C5 PFNA	*91*		*25 - 150*
13C2 PFDA	*98*		*25 - 150*
13C2 PFUnA	*91*		*25 - 150*
13C2 PFDoA	*90*		*25 - 150*
13C2 PFTeDA	*81*		*25 - 150*
13C2 PFHxDA	*63*		*25 - 150*
13C3 PFBS	*81*		*25 - 150*
18O2 PFHxS	*84*		*25 - 150*
13C4 PFOS	*79*		*25 - 150*
d5-NEtFOSAA	*92*		*25 - 150*
d3-NMeFOSAA	*86*		*25 - 150*
M2-4:2 FTS	*92*		*25 - 150*
M2-6:2 FTS	*98*		*25 - 150*
M2-8:2 FTS	*100*		*25 - 150*
d-N-MeFOSA-M	*78*		*25 - 150*
d-N-EtFOSA-M	*82*		*25 - 150*
d7-N-MeFOSE-M	*77*		*25 - 150*
d9-N-EtFOSE-M	*76*		*25 - 150*
13C3 HFPO-DA	*97*		*25 - 150*
13C-6:2 FTCA	*61*		*25 - 150*
13C-8:2 FTCA	*67*		*25 - 150*
13C2 10:2 FTS	*105*		*25 - 150*
13C-6:2 FTUCA	*118*		*25 - 150*

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

Lab Sample ID: LCSD 320-713658/3-A
Matrix: Solid
Analysis Batch: 716642

Client Sample ID: Lab Control Sample Dup
Prep Type: Pre-Treatment
Prep Batch: 713658

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluoropentanoic acid (PFPeA)			10.0	11.6		ug/Kg		116	69 - 129	6	30
Perfluorohexanoic acid (PFHxA)			10.0	10.4		ug/Kg		104	71 - 131	1	30
Perfluoroheptanoic acid (PFHpA)			10.0	10.7		ug/Kg		107	71 - 131	1	30
Perfluorooctanoic acid (PFOA)			10.0	9.81		ug/Kg		98	72 - 132	10	30
Perfluorononanoic acid (PFNA)			10.0	10.2		ug/Kg		102	73 - 133	1	30
Perfluorodecanoic acid (PFDA)			10.0	10.1		ug/Kg		101	72 - 132	3	30
Perfluoroundecanoic acid (PFUnA)			10.0	8.95		ug/Kg		90	66 - 126	13	30
Perfluorododecanoic acid (PFDoA)			10.0	10.0		ug/Kg		100	71 - 131	1	30
Perfluorotridecanoic acid (PFTrDA)			10.0	9.47		ug/Kg		95	71 - 131	5	30
Perfluorotetradecanoic acid (PFTeA)			10.0	9.49		ug/Kg		95	67 - 127	7	30
Perfluoro-n-hexadecanoic acid (PFHxDA)			10.0	10.1		ug/Kg		101	75 - 135	2	30
Perfluorobutanesulfonic acid (PFBS)			8.88	9.00		ug/Kg		101	69 - 129	11	30
Perfluoropentanesulfonic acid (PFPeS)			9.40	10.1		ug/Kg		108	66 - 126	2	30
Perfluorohexanesulfonic acid (PFHxS)			9.12	9.39		ug/Kg		103	62 - 122	3	30
Perfluoroheptanesulfonic acid (PFHpS)			9.54	10.9		ug/Kg		114	76 - 136	3	30
Perfluorooctanesulfonic acid (PFOS)			9.30	9.97		ug/Kg		107	68 - 141	3	30
Perfluorononanesulfonic acid (PFNS)			9.62	10.9		ug/Kg		113	72 - 132	2	30
Perfluorodecanesulfonic acid (PFDS)			9.64	10.5		ug/Kg		109	71 - 131	0	30
Perfluorododecanesulfonic acid (PFDoS)			9.70	9.47		ug/Kg		98	70 - 130	4	30
Perfluorooctanesulfonamide (FOSA)			10.0	9.68		ug/Kg		97	77 - 137	2	30
N-Methyl perfluorooctanesulfonamidoaceti c acid (NMeFOSAA)			10.0	9.45		ug/Kg		94	72 - 132	13	30
N-Ethyl perfluorooctanesulfonamidoaceti c acid (NEtFOSAA)			10.0	9.62		ug/Kg		96	72 - 132	1	30
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)			9.38	9.88		ug/Kg		105	68 - 143	15	30
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)			9.52	10.5		ug/Kg		110	73 - 139	6	30
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)			9.60	9.93		ug/Kg		103	75 - 135	1	30
1H,1H,2H,2H-Perfluorododecane sulfonic acid (10:2 FTS)			9.66	9.07		ug/Kg		94	69 - 145	0	30
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)			10.0	8.41		ug/Kg		84	43 - 153	6	30
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)			10.0	8.25		ug/Kg		83	44 - 155	9	30
9-Chlorohexadecafluoro-3-oxan onane-1-sulfonic acid (9Cl-PF3ONS)			9.34	11.2		ug/Kg		120	74 - 134	0	30

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

Lab Sample ID: LCSD 320-713658/3-A
Matrix: Solid
Analysis Batch: 716642

Client Sample ID: Lab Control Sample Dup
Prep Type: Pre-Treatment
Prep Batch: 713658

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA/GenX)			10.0	10.2		ug/Kg		102	53 - 158	2	30
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)			9.44	9.94		ug/Kg		105	66 - 136	5	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)			9.46	10.7		ug/Kg		113	79 - 139	6	30
3-Perfluoropentylpropanoic acid (5:3 FTCA)			10.0	13.3		ug/Kg		133	50 - 150	7	30
3-Perfluoroheptylpropanoic acid (7:3 FTCA)			10.0	13.9		ug/Kg		139	50 - 150	2	30
PFECHS			9.24	8.77		ug/Kg		95	50 - 150	3	30
PFPrS			9.20	9.56		ug/Kg		104	50 - 150	1	30
6:2 FTUCA			10.0	12.5		ug/Kg		125	50 - 150	1	30
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)			10.0	10.4		ug/Kg		104	50 - 150	3	30
Perfluoro-4-methoxybutanoic acid (PFMBA)			10.0	14.9		ug/Kg		149	50 - 150	0	30
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)			8.92	9.63		ug/Kg		108	50 - 150	2	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C8 FOSA	*90*		*25 - 150*
13C5 PFPeA	*52*		*25 - 150*
13C2 PFHxA	*93*		*25 - 150*
13C4 PFHpA	*96*		*25 - 150*
13C4 PFOA	*95*		*25 - 150*
13C5 PFNA	*90*		*25 - 150*
13C2 PFDA	*96*		*25 - 150*
13C2 PFUnA	*102*		*25 - 150*
13C2 PFDoA	*97*		*25 - 150*
13C2 PFTeDA	*91*		*25 - 150*
13C2 PFHxDA	*72*		*25 - 150*
13C3 PFBS	*83*		*25 - 150*
18O2 PFHxS	*86*		*25 - 150*
13C4 PFOS	*83*		*25 - 150*
d5-NEtFOSAA	*96*		*25 - 150*
d3-NMeFOSAA	*91*		*25 - 150*
M2-4:2 FTS	*89*		*25 - 150*
M2-6:2 FTS	*94*		*25 - 150*
M2-8:2 FTS	*103*		*25 - 150*
d-N-MeFOSA-M	*83*		*25 - 150*
d-N-EtFOSA-M	*84*		*25 - 150*
d7-N-MeFOSE-M	*81*		*25 - 150*
d9-N-EtFOSE-M	*82*		*25 - 150*
13C3 HFPO-DA	*101*		*25 - 150*
13C-6:2 FTCA	*68*		*25 - 150*
13C-8:2 FTCA	*69*		*25 - 150*
13C2 10:2 FTS	*110*		*25 - 150*
13C-6:2 FTUCA	*121*		*25 - 150*

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

Lab Sample ID: MB 320-713655/1-A
Matrix: Solid
Analysis Batch: 716641

Client Sample ID: Method Blank
Prep Type: Post-Treatment
Prep Batch: 713655

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Perfluoropentanoic acid (PFPeA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Perfluorohexanoic acid (PFHxA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Perfluoroheptanoic acid (PFHpA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Perfluorooctanoic acid (PFOA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Perfluorononanoic acid (PFNA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Perfluorodecanoic acid (PFDA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Perfluoroundecanoic acid (PFUnA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Perfluorododecanoic acid (PFDoA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Perfluorotridecanoic acid (PFTrDA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Perfluorononanesulfonic acid (PFNS)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Perfluorododecanesulfonic acid (PFDoS)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Perfluorooctanesulfonamide (FOSA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
N-Methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA/GenX)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
3-Perfluoropropylpropanoic acid (3:3 FTCA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1

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

Lab Sample ID: MB 320-713655/1-A
Matrix: Solid
Analysis Batch: 716641

Client Sample ID: Method Blank
Prep Type: Post-Treatment
Prep Batch: 713655

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
3-Perfluoropentylpropanoic acid (5:3 FTCA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
3-Perfluoroheptylpropanoic acid (7:3 FTCA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
6:2 FTUCA	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND		1.0		ug/Kg		10/16/23 18:05	10/29/23 10:58	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*92*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
13C4 PFBA	*22*	*5-	*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
13C5 PFPeA	*94*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
13C2 PFHxA	*94*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
13C4 PFHpA	*102*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
13C4 PFOA	*100*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
13C5 PFNA	*94*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
13C2 PFDA	*99*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
13C2 PFUnA	*95*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
13C2 PFDoA	*90*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
13C2 PFTeDA	*93*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
13C2 PFHxDA	*84*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
13C3 PFBS	*89*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
18O2 PFHxS	*96*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
13C4 PFOS	*90*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
d5-NEtFOSAA	*101*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
d3-NMeFOSAA	*86*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
M2-4:2 FTS	*0*		*0 - 10*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
M2-6:2 FTS	*100*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
M2-8:2 FTS	*109*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
d-N-MeFOSA-M	*80*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
d-N-EtFOSA-M	*84*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
d7-N-MeFOSE-M	*79*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
d9-N-EtFOSE-M	*77*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
13C3 HFPO-DA	*101*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
13C-6:2 FTCA	*69*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
13C-8:2 FTCA	*64*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
13C2 10:2 FTS	*100*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*
13C-6:2 FTUCA	*117*		*25 - 150*	*10/16/23 18:05*	*10/29/23 10:58*	*1*

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

Lab Sample ID: LCS 320-713655/2-A
Matrix: Solid
Analysis Batch: 716641

Client Sample ID: Lab Control Sample
Prep Type: Post-Treatment
Prep Batch: 713655

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	10.0	13.4		ug/Kg		134	96 - 183
Perfluoropentanoic acid (PFPeA)	10.0	13.7		ug/Kg		137	81 - 141
Perfluorohexanoic acid (PFHxA)	10.0	17.0	*+	ug/Kg		170	92 - 152
Perfluoroheptanoic acid (PFHpA)	10.0	17.2	*+	ug/Kg		172	100 - 160
Perfluorooctanoic acid (PFOA)	10.0	24.0		ug/Kg		240	169 - 414
Perfluorononanoic acid (PFNA)	10.0	12.9		ug/Kg		129	82 - 142
Perfluorodecanoic acid (PFDA)	10.0	11.0		ug/Kg		110	81 - 141
Perfluoroundecanoic acid (PFUnA)	10.0	8.51		ug/Kg		85	70 - 130
Perfluorododecanoic acid (PFDoA)	10.0	8.71		ug/Kg		87	63 - 123
Perfluorotridecanoic acid (PFTrDA)	10.0	7.77		ug/Kg		78	63 - 123
Perfluorotetradecanoic acid (PFTeA)	10.0	6.32		ug/Kg		63	55 - 115
Perfluorobutanesulfonic acid (PFBS)	8.88	10.3		ug/Kg		116	74 - 134
Perfluoropentanesulfonic acid (PFPeS)	9.40	10.4		ug/Kg		111	68 - 134
Perfluorohexanesulfonic acid (PFHxS)	9.12	9.23		ug/Kg		101	61 - 121
Perfluoroheptanesulfonic acid (PFHpS)	9.54	10.6		ug/Kg		111	68 - 128
Perfluorooctanesulfonic acid (PFOS)	9.30	10.5		ug/Kg		113	70 - 138
Perfluorononanesulfonic acid (PFNS)	9.62	9.71		ug/Kg		101	66 - 126
Perfluorodecanesulfonic acid (PFDS)	9.64	10.2		ug/Kg		106	66 - 126
Perfluorododecanesulfonic acid (PFDoS)	9.70	8.57		ug/Kg		88	70 - 130
Perfluorooctanesulfonamide (FOSA)	10.0	ND		ug/Kg		0	0 - 10
N-Methyl perfluorooctanesulfonamidoaceti c acid (NMeFOSAA)	10.0	ND		ug/Kg		0	0 - 10
N-Ethyl perfluorooctanesulfonamidoaceti c acid (NEtFOSAA)	10.0	ND		ug/Kg		0	0 - 10
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	9.38	ND		ug/Kg		0	0 - 10
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	9.52	ND		ug/Kg		0	0 - 10
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	9.60	ND		ug/Kg		0	0 - 10
N-ethylperfluorooctane sulfonamide (NEtFOSA)	10.0	ND		ug/Kg		0	0 - 10
N-methylperfluorooctane sulfonamide (NMeFOSA)	10.0	ND		ug/Kg		0	0 - 10
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	10.0	ND		ug/Kg		0	0 - 10
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	10.0	ND		ug/Kg		0	0 - 10

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

Lab Sample ID: LCS 320-713655/2-A
Matrix: Solid
Analysis Batch: 716641

Client Sample ID: Lab Control Sample
Prep Type: Post-Treatment
Prep Batch: 713655

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	9.34	9.90		ug/Kg		106	74 - 134
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA/GenX)	10.0	5.49		ug/Kg		55	53 - 158
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	9.44	7.30		ug/Kg		77	66 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	9.46	ND		ug/Kg		0	0 - 10
3-Perfluoropropylpropanoic acid (3:3 FTCA)	10.0	ND		ug/Kg		0	0 - 10
3-Perfluoropentylpropanoic acid (5:3 FTCA)	10.0	ND		ug/Kg		0	0 - 10
3-Perfluoroheptylpropanoic acid (7:3 FTCA)	10.0	ND		ug/Kg		0	0 - 10
6:2 FTUCA	10.0	ND		ug/Kg		0	0 - 10
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	10.0	4.55	*-	ug/Kg		46	50 - 150
Perfluoro-4-methoxybutanoic acid (PFMBA)	10.0	3.68	*-	ug/Kg		37	50 - 150
Perfluoro-3-methoxypropanoic acid (PFMPA)	10.0	5.26		ug/Kg		53	50 - 150
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	8.92	10.2		ug/Kg		115	50 - 150

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C8 FOSA	*90*		*25 - 150*
13C4 PFBA	*35*		*25 - 150*
13C5 PFPeA	*96*		*25 - 150*
13C2 PFHxA	*93*		*25 - 150*
13C4 PFHpA	*102*		*25 - 150*
13C4 PFOA	*97*		*25 - 150*
13C5 PFNA	*98*		*25 - 150*
13C2 PFDA	*103*		*25 - 150*
13C2 PFUnA	*98*		*25 - 150*
13C2 PFDoA	*101*		*25 - 150*
13C2 PFTeDA	*97*		*25 - 150*
13C2 PFHxDA	*80*		*25 - 150*
13C3 PFBS	*86*		*25 - 150*
18O2 PFHxS	*96*		*25 - 150*
13C4 PFOS	*86*		*25 - 150*
d5-NEtFOSAA	*94*		*25 - 150*
d3-NMeFOSAA	*94*		*25 - 150*
M2-4:2 FTS	*0*		*0 - 10*
M2-6:2 FTS	*104*		*25 - 150*
M2-8:2 FTS	*114*		*25 - 150*
d-N-MeFOSA-M	*79*		*25 - 150*
d-N-EtFOSA-M	*83*		*25 - 150*
d7-N-MeFOSE-M	*85*		*25 - 150*
d9-N-EtFOSE-M	*76*		*25 - 150*
13C3 HFPO-DA	*105*		*25 - 150*

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

Lab Sample ID: LCS 320-713655/2-A
Matrix: Solid
Analysis Batch: 716641

Client Sample ID: Lab Control Sample
Prep Type: Post-Treatment
Prep Batch: 713655

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C-6:2 FTCA	*71*		*25 - 150*
13C-8:2 FTCA	*73*		*25 - 150*
13C2 10:2 FTS	*106*		*25 - 150*
13C-6:2 FTUCA	*130*		*25 - 150*

Lab Sample ID: LCSD 320-713655/3-A
Matrix: Solid
Analysis Batch: 716641

Client Sample ID: Lab Control Sample Dup
Prep Type: Post-Treatment
Prep Batch: 713655

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA)			10.0	11.6		ug/Kg		116	96 - 183	14	30
Perfluoropentanoic acid (PFPeA)			10.0	12.5		ug/Kg		125	81 - 141	9	30
Perfluorohexanoic acid (PFHxA)			10.0	16.0	*+	ug/Kg		160	92 - 152	7	30
Perfluoroheptanoic acid (PFHpA)			10.0	15.7		ug/Kg		157	100 - 160	9	30
Perfluorooctanoic acid (PFOA)			10.0	26.1		ug/Kg		261	169 - 414	8	30
Perfluorononanoic acid (PFNA)			10.0	13.6		ug/Kg		136	82 - 142	5	30
Perfluorodecanoic acid (PFDA)			10.0	12.5		ug/Kg		125	81 - 141	13	30
Perfluoroundecanoic acid (PFUnA)			10.0	8.95		ug/Kg		90	70 - 130	5	30
Perfluorododecanoic acid (PFDoA)			10.0	9.47		ug/Kg		95	63 - 123	8	30
Perfluorotridecanoic acid (PFTrDA)			10.0	8.52		ug/Kg		85	63 - 123	9	30
Perfluorotetradecanoic acid (PFTeA)			10.0	6.51		ug/Kg		65	55 - 115	3	30
Perfluorobutanesulfonic acid (PFBS)			8.88	9.42		ug/Kg		106	74 - 134	9	30
Perfluoropentanesulfonic acid (PFPeS)			9.40	10.1		ug/Kg		108	68 - 134	3	30
Perfluorohexanesulfonic acid (PFHxS)			9.12	9.76		ug/Kg		107	61 - 121	6	30
Perfluoroheptanesulfonic acid (PFHpS)			9.54	10.3		ug/Kg		108	68 - 128	3	30
Perfluorooctanesulfonic acid (PFOS)			9.30	10.8		ug/Kg		116	70 - 138	3	30
Perfluorononanesulfonic acid (PFNS)			9.62	9.66		ug/Kg		100	66 - 126	1	30
Perfluorodecanesulfonic acid (PFDS)			9.64	9.91		ug/Kg		103	66 - 126	3	30
Perfluorododecanesulfonic acid (PFDoS)			9.70	7.04		ug/Kg		73	70 - 130	20	30
Perfluorooctanesulfonamide (FOSA)			10.0	ND		ug/Kg		0	0 - 10	NC	30
N-Methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			10.0	ND		ug/Kg		0	0 - 10	NC	30
N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			10.0	ND		ug/Kg		0	0 - 10	NC	30
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)			9.38	ND		ug/Kg		0	0 - 10	NC	30
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)			9.52	ND		ug/Kg		0	0 - 10	NC	30

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

Lab Sample ID: LCSD 320-713655/3-A
Matrix: Solid
Analysis Batch: 716641

Client Sample ID: Lab Control Sample Dup
Prep Type: Post-Treatment
Prep Batch: 713655

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)			9.60	ND		ug/Kg		0	0 - 10	NC	30
N-ethylperfluorooctane sulfonamide (NEtFOSA)			10.0	ND		ug/Kg		0	0 - 10	NC	30
N-methylperfluorooctane sulfonamide (NMeFOSA)			10.0	ND		ug/Kg		0	0 - 10	NC	30
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)			10.0	ND		ug/Kg		0	0 - 10	NC	30
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)			10.0	ND		ug/Kg		0	0 - 10	NC	30
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)			9.34	9.41		ug/Kg		101	74 - 134	5	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA/GenX)			10.0	5.16	*-	ug/Kg		52	53 - 158	6	30
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)			9.44	6.82		ug/Kg		72	66 - 136	7	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)			9.46	ND		ug/Kg		0	0 - 10	NC	30
3-Perfluoropropylpropanoic acid (3:3 FTCA)			10.0	ND		ug/Kg		0	0 - 10	NC	30
3-Perfluoropentylpropanoic acid (5:3 FTCA)			10.0	ND		ug/Kg		0	0 - 10	NC	30
3-Perfluoroheptylpropanoic acid (7:3 FTCA)			10.0	ND		ug/Kg		0	0 - 10	NC	30
6:2 FTUCA			10.0	ND		ug/Kg		0	0 - 10	NC	30
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)			10.0	4.72	*-	ug/Kg		47	50 - 150	4	30
Perfluoro-4-methoxybutanoic acid (PFMBA)			10.0	3.24	*-	ug/Kg		32	50 - 150	13	30
Perfluoro-3-methoxypropanoic acid (PFMPA)			10.0	5.16		ug/Kg		52	50 - 150	2	30
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)			8.92	9.69		ug/Kg		109	50 - 150	5	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C8 FOSA	*94*		*25 - 150*
13C4 PFBA	*41*		*25 - 150*
13C5 PFPeA	*102*		*25 - 150*
13C2 PFHxA	*96*		*25 - 150*
13C4 PFHpA	*102*		*25 - 150*
13C4 PFOA	*97*		*25 - 150*
13C5 PFNA	*96*		*25 - 150*
13C2 PFDA	*100*		*25 - 150*
13C2 PFUnA	*101*		*25 - 150*
13C2 PFDoA	*93*		*25 - 150*
13C2 PFTeDA	*99*		*25 - 150*
13C2 PFHxDA	*87*		*25 - 150*
13C3 PFBS	*89*		*25 - 150*
18O2 PFHxS	*95*		*25 - 150*
13C4 PFOS	*90*		*25 - 150*
d5-NEtFOSAA	*96*		*25 - 150*

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

Lab Sample ID: LCSD 320-713655/3-A
Matrix: Solid
Analysis Batch: 716641

Client Sample ID: Lab Control Sample Dup
Prep Type: Post-Treatment
Prep Batch: 713655

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
d3-NMeFOSAA	92		25 - 150
M2-4:2 FTS	0		0 - 10
M2-6:2 FTS	103		25 - 150
M2-8:2 FTS	100		25 - 150
d-N-MeFOSA-M	84		25 - 150
d-N-EtFOSA-M	82		25 - 150
d7-N-MeFOSE-M	89		25 - 150
d9-N-EtFOSE-M	77		25 - 150
13C3 HFPO-DA	99		25 - 150
13C-6:2 FTCA	71		25 - 150
13C-8:2 FTCA	73		25 - 150
13C2 10:2 FTS	108		25 - 150
13C-6:2 FTUCA	130		25 - 150

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

Lab Sample ID: MB 320-717648/1-A
Matrix: Solid
Analysis Batch: 721268

Client Sample ID: Method Blank
Prep Type: Pre-Treatment
Prep Batch: 717648

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA) - RE	ND		1.0		ug/Kg		11/02/23 21:25	11/18/23 04:08	1
Perfluoro-n-octadecanoic acid (PFODA) - RE	ND		1.0		ug/Kg		11/02/23 21:25	11/18/23 04:08	1
N-ethylperfluorooctane sulfonamide (NEtFOSA) - RE	ND		1.0		ug/Kg		11/02/23 21:25	11/18/23 04:08	1
N-methylperfluorooctane sulfonamide (NMeFOSA) - RE	ND		1.0		ug/Kg		11/02/23 21:25	11/18/23 04:08	1
3-Perfluoropropylpropanoic acid (3:3 FTCA) - RE	ND		1.0		ug/Kg		11/02/23 21:25	11/18/23 04:08	1
Perfluoro-3-methoxypropanoic acid (PFMPA) - RE	ND		1.0		ug/Kg		11/02/23 21:25	11/18/23 04:08	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA - RE	90		25 - 150	11/02/23 21:25	11/18/23 04:08	1
13C5 PFPeA - RE	95		25 - 150	11/02/23 21:25	11/18/23 04:08	1
13C2 PFHxDA - RE	107		25 - 150	11/02/23 21:25	11/18/23 04:08	1
13C3 PFBS - RE	94		25 - 150	11/02/23 21:25	11/18/23 04:08	1
d-N-MeFOSA-M - RE	76		25 - 150	11/02/23 21:25	11/18/23 04:08	1
d-N-EtFOSA-M - RE	92		25 - 150	11/02/23 21:25	11/18/23 04:08	1

Lab Sample ID: LCS 320-717648/2-A
Matrix: Solid
Analysis Batch: 721268

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 717648

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA) - RE	10.0	9.68		ug/Kg		97	76 - 136
Perfluoro-n-octadecanoic acid (PFODA) - RE	10.0	8.02		ug/Kg		80	53 - 130

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

Lab Sample ID: LCS 320-717648/2-A
Matrix: Solid
Analysis Batch: 721268

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 717648

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
N-ethylperfluorooctane sulfonamide (NEtFOSA) - RE			10.0	9.79		ug/Kg		98	47 - 161		
N-methylperfluorooctane sulfonamide (NMeFOSA) - RE			10.0	8.07		ug/Kg		81	63 - 148		
3-Perfluoropropylpropanoic acid (3:3 FTCA) - RE			10.0	8.11		ug/Kg		81	50 - 150		
Perfluoro-3-methoxypropanoic acid (PFMPA) - RE			10.0	7.97		ug/Kg		80	50 - 150		

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFBA - RE	*56*		*25 - 150*
13C5 PFPeA - RE	*96*		*25 - 150*
13C2 PFHxDA - RE	*100*		*25 - 150*
13C3 PFBS - RE	*90*		*25 - 150*
d-N-MeFOSA-M - RE	*81*		*25 - 150*
d-N-EtFOSA-M - RE	*94*		*25 - 150*

Lab Sample ID: LCSD 320-717648/3-A
Matrix: Solid
Analysis Batch: 721268

Client Sample ID: Lab Control Sample Dup
Prep Type: Pre-Treatment
Prep Batch: 717648

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA) - RE			10.0	9.16		ug/Kg		92	76 - 136	6	30
Perfluoro-n-octadecanoic acid (PFODA) - RE			10.0	6.05		ug/Kg		60	53 - 130	28	30
N-ethylperfluorooctane sulfonamide (NEtFOSA) - RE			10.0	9.73		ug/Kg		97	47 - 161	1	30
N-methylperfluorooctane sulfonamide (NMeFOSA) - RE			10.0	8.36		ug/Kg		84	63 - 148	4	30
3-Perfluoropropylpropanoic acid (3:3 FTCA) - RE			10.0	2.91	*- *1	ug/Kg		29	50 - 150	94	30
Perfluoro-3-methoxypropanoic acid (PFMPA) - RE			10.0	4.23	*- *1	ug/Kg		42	50 - 150	61	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C4 PFBA - RE	*19*	*5-	*25 - 150*
13C5 PFPeA - RE	*78*		*25 - 150*
13C2 PFHxDA - RE	*86*		*25 - 150*
13C3 PFBS - RE	*87*		*25 - 150*
d-N-MeFOSA-M - RE	*101*		*25 - 150*
d-N-EtFOSA-M - RE	*96*		*25 - 150*

LCMS

Prep Batch: 713655

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-105423-1	KULA ASH #1	Post-Treatment	Solid	TOP Post-Prep	
MB 320-713655/1-A	Method Blank	Post-Treatment	Solid	TOP Post-Prep	
LCS 320-713655/2-A	Lab Control Sample	Post-Treatment	Solid	TOP Post-Prep	
LCSD 320-713655/3-A	Lab Control Sample Dup	Post-Treatment	Solid	TOP Post-Prep	

Prep Batch: 713658

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-105423-1	KULA ASH #1	Pre-Treatment	Solid	TOP Pre-Prep	
MB 320-713658/1-A	Method Blank	Pre-Treatment	Solid	TOP Pre-Prep	
LCS 320-713658/2-A	Lab Control Sample	Pre-Treatment	Solid	TOP Pre-Prep	
LCSD 320-713658/3-A	Lab Control Sample Dup	Pre-Treatment	Solid	TOP Pre-Prep	

Analysis Batch: 716641

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-105423-1	KULA ASH #1	Post-Treatment	Solid	537 (modified)	713655
MB 320-713655/1-A	Method Blank	Post-Treatment	Solid	537 (modified)	713655
LCS 320-713655/2-A	Lab Control Sample	Post-Treatment	Solid	537 (modified)	713655
LCSD 320-713655/3-A	Lab Control Sample Dup	Post-Treatment	Solid	537 (modified)	713655

Analysis Batch: 716642

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-105423-1	KULA ASH #1	Pre-Treatment	Solid	537 (modified)	713658
MB 320-713658/1-A	Method Blank	Pre-Treatment	Solid	537 (modified)	713658
LCS 320-713658/2-A	Lab Control Sample	Pre-Treatment	Solid	537 (modified)	713658
LCSD 320-713658/3-A	Lab Control Sample Dup	Pre-Treatment	Solid	537 (modified)	713658

Prep Batch: 717648

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-105423-1 - RE	KULA ASH #1	Pre-Treatment	Solid	TOP Pre-Prep	
MB 320-717648/1-A - RE	Method Blank	Pre-Treatment	Solid	TOP Pre-Prep	
LCS 320-717648/2-A - RE	Lab Control Sample	Pre-Treatment	Solid	TOP Pre-Prep	
LCSD 320-717648/3-A - RE	Lab Control Sample Dup	Pre-Treatment	Solid	TOP Pre-Prep	

Analysis Batch: 721268

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-105423-1 - RE	KULA ASH #1	Pre-Treatment	Solid	537 (modified)	717648
MB 320-717648/1-A - RE	Method Blank	Pre-Treatment	Solid	537 (modified)	717648
LCS 320-717648/2-A - RE	Lab Control Sample	Pre-Treatment	Solid	537 (modified)	717648
LCSD 320-717648/3-A - RE	Lab Control Sample Dup	Pre-Treatment	Solid	537 (modified)	717648

Analysis Batch: 722149

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-105423-1	KULA ASH #1	Pre-Treatment	Solid	Total PFCA-Sum	

Analysis Batch: 722152

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-105423-1	KULA ASH #1	Post-Treatment	Solid	Total PFCA-Sum	

Analysis Batch: 722167

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-105423-1	KULA ASH #1	Total/NA	Solid	Total PFCA-Dif	

Lab Chronicle

Client: Hawaii Department of Health
Project/Site: DOH Maui Wildfire Ash Sample- KULA

Job ID: 320-105423-1

Client Sample ID: KULA ASH #1

Date Collected: 09/21/23 17:00
Date Received: 09/29/23 09:15

Lab Sample ID: 320-105423-1

Matrix: Solid

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			1.03 g	10.0 mL	713655	10/16/23 18:05	FX	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	716641	10/29/23 11:54	RS1	EET SAC
Pre-Treatment	Prep	TOP Pre-Prep			1.06 g	10.0 mL	713658	10/16/23 18:20	FX	EET SAC
Pre-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	716642	10/29/23 16:10	RS1	EET SAC
Pre-Treatment	Prep	TOP Pre-Prep	RE		1.06 g	10.0 mL	717648	11/02/23 21:31	FX	EET SAC
Pre-Treatment	Analysis	537 (modified)	RE	1	1 mL	1 mL	721268	11/18/23 05:37	D1R	EET SAC
Total/NA	Analysis	Total PFCA-Dif		1			722167	11/21/23 14:21	MKW	EET SAC
Post-Treatment	Analysis	Total PFCA-Sum		1			722152	10/29/23 11:54	MKW	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			722149	11/18/23 05:37	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
Job ID: 320-105423-1
Project/Site: DOH Maui Wildfire Ash Sample- KULA

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	Solid	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)
537 (modified)	TOP Post-Prep	Solid	1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)
537 (modified)	TOP Post-Prep	Solid	1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)
537 (modified)	TOP Post-Prep	Solid	1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)
537 (modified)	TOP Post-Prep	Solid	3-Perfluoroheptylpropanoic acid (7:3 FTCA)
537 (modified)	TOP Post-Prep	Solid	3-Perfluoropentylpropanoic acid (5:3 FTCA)
537 (modified)	TOP Post-Prep	Solid	3-Perfluoropropylpropanoic acid (3:3 FTCA)
537 (modified)	TOP Post-Prep	Solid	4,8-Dioxa-3H-perfluorononanoic acid (ADONA)
537 (modified)	TOP Post-Prep	Solid	6:2 FTUCA
537 (modified)	TOP Post-Prep	Solid	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)
537 (modified)	TOP Post-Prep	Solid	Hexafluoropropylene Oxide Dimer Acid (HFPO-DA/GenX)
537 (modified)	TOP Post-Prep	Solid	N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)
537 (modified)	TOP Post-Prep	Solid	N-ethylperfluorooctane sulfonamide (NEtFOSA)
537 (modified)	TOP Post-Prep	Solid	N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)
537 (modified)	TOP Post-Prep	Solid	N-Methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)
537 (modified)	TOP Post-Prep	Solid	N-methylperfluorooctane sulfonamide (NMeFOSA)
537 (modified)	TOP Post-Prep	Solid	N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)
537 (modified)	TOP Post-Prep	Solid	Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)
537 (modified)	TOP Post-Prep	Solid	Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)
537 (modified)	TOP Post-Prep	Solid	Perfluoro-3-methoxypropanoic acid (PFMPA)
537 (modified)	TOP Post-Prep	Solid	Perfluoro-4-methoxybutanoic acid (PFMBA)
537 (modified)	TOP Post-Prep	Solid	Perfluorobutanesulfonic acid (PFBS)
537 (modified)	TOP Post-Prep	Solid	Perfluorobutanoic acid (PFBA)
537 (modified)	TOP Post-Prep	Solid	Perfluorodecanesulfonic acid (PFDS)
537 (modified)	TOP Post-Prep	Solid	Perfluorodecanoic acid (PFDA)
537 (modified)	TOP Post-Prep	Solid	Perfluorododecanesulfonic acid (PFDoS)
537 (modified)	TOP Post-Prep	Solid	Perfluorododecanoic acid (PFDoA)
537 (modified)	TOP Post-Prep	Solid	Perfluoroheptanesulfonic acid (PFHpS)
537 (modified)	TOP Post-Prep	Solid	Perfluoroheptanoic acid (PFHpA)
537 (modified)	TOP Post-Prep	Solid	Perfluorohexanesulfonic acid (PFHxS)

Client: Hawaii Department of Health
Job ID: 320-105423-1
Project/Site: DOH Maui Wildfire Ash Sample- KULA

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	Solid	Perfluorohexanoic acid (PFHxA)
537 (modified)	TOP Post-Prep	Solid	Perfluorononanesulfonic acid (PFNS)
537 (modified)	TOP Post-Prep	Solid	Perfluorononanoic acid (PFNA)
537 (modified)	TOP Post-Prep	Solid	Perfluorooctanesulfonamide (FOSA)
537 (modified)	TOP Post-Prep	Solid	Perfluorooctanesulfonic acid (PFOS)
537 (modified)	TOP Post-Prep	Solid	Perfluorooctanoic acid (PFOA)
537 (modified)	TOP Post-Prep	Solid	Perfluoropentanesulfonic acid (PFPeS)
537 (modified)	TOP Post-Prep	Solid	Perfluoropentanoic acid (PFPeA)
537 (modified)	TOP Post-Prep	Solid	Perfluorotetradecanoic acid (PFTeA)
537 (modified)	TOP Post-Prep	Solid	Perfluorotridecanoic acid (PFTrDA)
537 (modified)	TOP Post-Prep	Solid	Perfluoroundecanoic acid (PFUnA)
537 (modified)	TOP Pre-Prep	Solid	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)
537 (modified)	TOP Pre-Prep	Solid	1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)
537 (modified)	TOP Pre-Prep	Solid	1H,1H,2H,2H-Perfluorododecane sulfonic acid (10:2 FTS)
537 (modified)	TOP Pre-Prep	Solid	1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)
537 (modified)	TOP Pre-Prep	Solid	1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)
537 (modified)	TOP Pre-Prep	Solid	3-Perfluoroheptylpropanoic acid (7:3 FTCA)
537 (modified)	TOP Pre-Prep	Solid	3-Perfluoropentylpropanoic acid (5:3 FTCA)
537 (modified)	TOP Pre-Prep	Solid	3-Perfluoropropylpropanoic acid (3:3 FTCA)
537 (modified)	TOP Pre-Prep	Solid	4,8-Dioxa-3H-perfluorononanoic acid (ADONA)
537 (modified)	TOP Pre-Prep	Solid	6:2 FTUCA
537 (modified)	TOP Pre-Prep	Solid	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)
537 (modified)	TOP Pre-Prep	Solid	Hexafluoropropylene Oxide Dimer Acid (HFPO-DA/GenX)
537 (modified)	TOP Pre-Prep	Solid	N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)
537 (modified)	TOP Pre-Prep	Solid	N-ethylperfluorooctane sulfonamide (NEtFOSA)
537 (modified)	TOP Pre-Prep	Solid	N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)
537 (modified)	TOP Pre-Prep	Solid	N-Methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)
537 (modified)	TOP Pre-Prep	Solid	N-methylperfluorooctane sulfonamide (NMeFOSA)
537 (modified)	TOP Pre-Prep	Solid	N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)
537 (modified)	TOP Pre-Prep	Solid	Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)
537 (modified)	TOP Pre-Prep	Solid	Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)

Client: Hawaii Department of Health
Job ID: 320-105423-1
Project/Site: DOH Maui Wildfire Ash Sample- KULA

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	Solid	Perfluoro-3-methoxypropanoic acid (PFMPA)
537 (modified)	TOP Pre-Prep	Solid	Perfluoro-4-methoxybutanoic acid (PFMBA)
537 (modified)	TOP Pre-Prep	Solid	Perfluorobutanesulfonic acid (PFBS)
537 (modified)	TOP Pre-Prep	Solid	Perfluorobutanoic acid (PFBA)
537 (modified)	TOP Pre-Prep	Solid	Perfluorodecanesulfonic acid (PFDS)
537 (modified)	TOP Pre-Prep	Solid	Perfluorodecanoic acid (PFDA)
537 (modified)	TOP Pre-Prep	Solid	Perfluorododecanesulfonic acid (PFDoS)
537 (modified)	TOP Pre-Prep	Solid	Perfluorododecanoic acid (PFDoA)
537 (modified)	TOP Pre-Prep	Solid	Perfluoroheptanesulfonic acid (PFHpS)
537 (modified)	TOP Pre-Prep	Solid	Perfluoroheptanoic acid (PFHpA)
537 (modified)	TOP Pre-Prep	Solid	Perfluorohexanesulfonic acid (PFHxS)
537 (modified)	TOP Pre-Prep	Solid	Perfluorohexanoic acid (PFHxA)
537 (modified)	TOP Pre-Prep	Solid	Perfluoro-n-hexadecanoic acid (PFHxDA)
537 (modified)	TOP Pre-Prep	Solid	Perfluoro-n-octadecanoic acid (PFODA)
537 (modified)	TOP Pre-Prep	Solid	Perfluorononanesulfonic acid (PFNS)
537 (modified)	TOP Pre-Prep	Solid	Perfluorononanoic acid (PFNA)
537 (modified)	TOP Pre-Prep	Solid	Perfluorooctanesulfonamide (FOSA)
537 (modified)	TOP Pre-Prep	Solid	Perfluorooctanesulfonic acid (PFOS)
537 (modified)	TOP Pre-Prep	Solid	Perfluorooctanoic acid (PFOA)
537 (modified)	TOP Pre-Prep	Solid	Perfluoropentanesulfonic acid (PFPeS)
537 (modified)	TOP Pre-Prep	Solid	Perfluoropentanoic acid (PFPeA)
537 (modified)	TOP Pre-Prep	Solid	Perfluorotetradecanoic acid (PFTeA)
537 (modified)	TOP Pre-Prep	Solid	Perfluorotridecanoic acid (PFTrDA)
537 (modified)	TOP Pre-Prep	Solid	Perfluoroundecanoic acid (PFUnA)
537 (modified)	TOP Pre-Prep	Solid	PFECHS
537 (modified)	TOP Pre-Prep	Solid	PFPrS
Total PFCA-Dif		Solid	PFBA
Total PFCA-Dif		Solid	PFHpA
Total PFCA-Dif		Solid	PFHxA
Total PFCA-Dif		Solid	PFNA
Total PFCA-Dif		Solid	PFOA
Total PFCA-Dif		Solid	PFPA
Total PFCA-Dif		Solid	Total PFCA
Total PFCA-Sum		Solid	Total PFCA

Method Summary

Client: Hawaii Department of Health
Job ID: 320-105423-1
Project/Site: DOH Maui Wildfire Ash Sample- KULA

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	Shake Extraction with Ultrasonic Bath Extraction	SW846	EET SAC
TOP Pre-Prep	Shake Extraction with Ultrasonic Bath Extraction	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: DOH Maui Wildfire Ash Sample- KULA

Job ID: 320-105423-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-105423-1	KULA ASH #1	Solid	09/21/23 17:00	09/29/23 09:15

EUROFINS

CHAIN-OF-CUSTODY RECORD

TETRA TECH

Client Name/Account #: TetraTech, Inc.

Address: 737 Bishop St., Suite 2000

City/State/Zip: Honolulu, HI 96813

Project Manager: Eric Jensen (eric.jensen@tetratech.com)

Telephone Number: 808.225.7084 Fax No. NA

Sampler Name (Print): Roger Brewer, DOH

Sampler Signature: Roger Brewer, DOH

Report To: Eric Jensen

Invoice To: Eric Jensen

Project ID: DOH Maui Wildfire Ash Sample - KULA

Project #: 103S864023138

Sample ID / Description	Date Sampled	Time Sampled	No. of Containers Shipped	Grab	Composite	Multi-incremental Sample	Preservative: None	Preservative: HNO_3 (Red Label)	Preservative: HCl (Blue Label)	Preservative: NaOH (Orange Label)	Preservative: H_2SO_4 Plastic (Yellow Label)	Preservative: H_2SO_4 Glass(Yellow Label)	Preservative: None (Black Label)	Preservative: Other (one MeOH VOA)	Matrix: Groundwater	Matrix: Wastewater	Matrix: Drinking Water	Matrix: Sludge	Matrix: Soil	Matrix: Other (specify): ASH	Analyze For: Multi-incremental	Analyze For: PFAS Total Oxidizable Precursor Assay (TOP), Pre- and Post-TOP via Eurofins Method 537 Modified (41 analytes)	Analyze For: PFAS Non-Target Analysis (NTA) Top 10 Peaks, via LC/QTOF/MS (no specific Method)	RUSH TAT (Pre-Schedule)	Standard TAT
KULA ASH #1	9/21/23	1700	1			1	X													X	X	X	X	X	

320-105423 Chain of Custody

Special Instructions.

MI Subsamples to be provided by Torrent Laboratory

Lab manager stated 15-DAY RUSH TAT possible due to Maui wildfire sample

TEST 5 GRAM ALIQUOTS

Attn Karen Dahl, karen.dahl@et.eurofinsus.com

Laboratory Comments

Temperature Upon Receipt: 8 8°C

VOCs Free of Headspace? Y N

Method of Shipment: FEDEX

Relinquished by	Date	Time	Received by	Date	Time
Roger Brewer DOH	9/26/2023	0800	Eric Jensen, Tetra Tech	9/26/2023	0800
Relinquished by	Date	Time	Received by Laboratory	Date	Time
Eric Jensen to FedEx	9/26/2023	1500	L D Imbat	9-27-23	1058

Page 1 of 1

Relinquished L D Imbat 9-28-23 14:00 Received 09/29/23 0915

eurofins | Environment Testing

Sacramento
Sample Receiving Notes

Loc 320
105423

Tracking # 7735 7859 9726

Job._____ _____

SO / PO / FO / SAT / 2-Day / Ground / UPS / CDO / Courier
GSL / OnTrac / Goldstreak / USPS / Other_____

Use this form to record Sample Custody Seal Cooler Custody Seal Temperature & corrected Temperature & other observations.
File in the job folder with the COC.

Therm ID L06 Corr Factor (+ /) NA °C

Ice_____ Wet_____ Gel ✓ Other_____

Cooler Custody Seal _____

Cooler ID _____

Temp Observed 8.8 °C Corrected 8.8 °C
From Temp Blank ☐ Sample ☑

Opening/Processing The Shipment	Yes	No	NA
Cooler compromised/tampered with?	☐	☑	☐
Cooler Temperature is acceptable?	☐	☑	☐
Frozen samples show signs of thaw?	☐	☐	☑

Initials. DM Date. 09/29/23

Unpacking/Labeling The Samples	Yes	No	NA
Containers are not broken or leaking?	☑	☐	☐
Samples compromised/tampered with?	☐	☑	☐
COC is complete w/o discrepancies	☑	☐	☐
Sample custody seal?	☐	☐	☑
Sample containers have legible labels?	☑	☐	☐
Sample date/times are provided?	☑	☐	☐
Appropriate containers are used?	☑	☐	☐
Sample bottles are completely filled?	☑	☐	☐
Sample preservatives verified?	☐	☐	☑
Is the Field Sampler's name on COC?	☑	☐	☐
Samples w/o discrepancies?	☑	☐	☐
Zero headspace?*	☐	☐	☑
Alkalinity has no headspace?	☐	☐	☑
Perchlorate has headspace? (Methods 314, 331 6850)	☐	☐	☑
Multiphasic samples are not present?	☑	☐	☐

*Containers requiring zero headspace have no headspace, or bubble < 6 mm (1/4")

Initials DM Date. 09/29/23

Notes. Out of temp.

Trizma Lot #(s) _____

Ammonium
Acetate Lot #(s) _____

Login Completion	Yes	No	NA
Receipt Temperature on COC?	☑	☐	☐
NCM Filed?	☑	☐	☐
Samples received within hold time?	☑	☐	☐
Log Release checked in TALS?	☑	☐	☐

Initials. DM Date. 09/29/23

Login Sample Receipt Checklist

Client: Hawaii Department of Health

Job Number: 320-105423-1

Login Number: 105423
List Number: 1
Creator: Oropeza, Salvador

List Source: Eurofins Sacramento

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