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Automated Report

Technical Report for

Tetra Tech

Red Hill AFFF; HI

SGS Job Number: FC1128

Sampling Date: 12/02/22

Report to:

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Honolulu, HI 96813
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ATTN: Eric Jensen

Total number of pages in report: 37



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

A handwritten signature in black ink that reads "Norm Farmer".

**Norm Farmer
Technical Director**

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Certifications: FL(E83510), LA(03051), KS(E-10327), NC(573), NJ(FL002), NY(12022), SC(96038001)
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Test results relate only to samples analyzed.

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Sample Summary

Tetra Tech

Job No: FC1128

Red Hill AFFF; HI

Sample Number	Collected Date	Time By	Received	Matrix Code	Type	Client Sample ID
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**This report contains results reported as ND = Not detected. The following applies:
Organics ND = Not detected above the MDL**

FC1128-1	12/02/22	11:00 RB	12/08/22	SO	Soil	DU-4A
FC1128-2	12/02/22	11:30 RB	12/08/22	SO	Soil	DU-4B
FC1128-3	12/02/22	13:00 RB	12/08/22	SO	Soil	DU-2
FC1128-4	12/02/22	19:55 RB	12/08/22	SO	Soil	DU-5
FC1128-4A	12/02/22	19:55 RB	12/08/22	SO	Soil	DU-5
FC1128-4B	12/02/22	19:55 RB	12/08/22	SO	Soil	DU-5

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client: Tetra Tech

Job No: FC1128

Site: Red Hill AFFF; HI

Report Date 12/22/2022 3:11:47 PM

On 12/08/2022, 4 Samples were received at SGS North America Inc - Orlando, at a maximum corrected temperature of 5.2 C. Samples were intact and chemically preserved, unless noted below. A SGS North America Inc. - Orlando Job Number of FC1128 was assigned to the project.

Laboratory sample ID, client sample ID and dates of sample collection are detailed in the report's Results Summary Section. Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

MS Semi-volatiles By Method EPA 537M QSM5.3 B-15

Matrix: SO

Batch ID: OP94484

- All samples were extracted within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Samples FC1128-IMS and FC1128-IMSD were used as the QC samples indicated.
- FC1128-2 for 13C2-PFDoDA: Outside control limits.
- FC1128-2 for 13C2-PFTeDA: Outside control limits.
- FC1128-2: Dilution required (ID recovery standard failure).
- FC1128-3 for 13C2-8:2FTS: Outside control limits.
- FC1128-3 for 13C6-PFDA: Outside control limits.
- FC1128-3 for 13C6-PFDA: Outside control limits.
- FC1128-3 for 13C8-FOSA: Outside control limits.
- FC1128-3 for 13C8-PFOA: Outside control limits.
- FC1128-3 for 13C9-PFNA: Outside control limits.
- FC1128-3 for d3-MeFOSAA: Outside control limits.
- FC1128-4 for 13C8-PFOA: Outside control limits.
- FC1128-4 for 13C6-PFDA: Outside control limits.
- FC1128-4 for 13C2-PFDoDA: Outside control limits.
- FC1128-4 for 13C2-PFTeDA: Outside control limits.
- FC1128-4 for d3-MeFOSAA: Outside control limits.
- FC1128-4 for 13C2-8:2FTS: Outside control limits.
- FC1128-4: Dilution required (ID recovery standard failure).
- FC1128-4A for 13C8-PFOA: Outside control limits.
- FC1128-4A for 13C6-PFDA: Outside control limits.
- FC1128-4A for 13C7-PFUnDA: Outside control limits.
- FC1128-4A for 13C2-PFDoDA: Outside control limits.
- FC1128-4A for 13C2-PFTeDA: Outside control limits.
- FC1128-4A for d3-MeFOSAA: Outside control limits.
- FC1128-4A for 13C2-6:2FTS: Outside control limits.
- FC1128-4A for 13C2-8:2FTS: Outside control limits.
- FC1128-4B for 13C8-PFOA: Outside control limits.
- FC1128-4B for 13C6-PFDA: Outside control limits.
- FC1128-4B for 13C7-PFUnDA: Outside control limits.
- FC1128-4B for 13C2-PFDoDA: Outside control limits.
- FC1128-4B for 13C2-PFTeDA: Outside control limits.
- FC1128-4B for 13C3-PFHxS: Outside control limits.
- FC1128-4B for 13C8-PFOS: Outside control limits.
- FC1128-4B for d3-MeFOSAA: Outside control limits.
- FC1128-4B for d5-EtFOSAA: Outside control limits.
- FC1128-4B for 13C2-4:2FTS: Outside control limits.

MS Semi-volatiles By Method EPA 537M QSM5.3 B-15

Matrix: SO

Batch ID: OP94484

FC1128-4B for 13C2-8:2FTS: Outside control limits.

Matrix: SO

Batch ID: OP94647

Samples FC1128-3 have surrogates outside control limits.

FC1128-3: Confirmation run.

SGS North America Inc. - Orlando certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting the Quality System precision, accuracy and completeness objectives except as noted. Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria. SGS North America Inc.- Orlando is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety.

Narrative prepared by:

Elizabeth Kent, Quality Assurance Officer (*Signature on File*)

Summary of Hits

Job Number: FC1128
 Account: Tetra Tech
 Project: Red Hill AFFF; HI
 Collected: 12/02/22



Lab Sample ID	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
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FC1128-1 DU-4A

Perfluorobutanoic acid	1.3	1.0	0.38	ug/kg	EPA 537M QSM5.3 B-15
Perfluoropentanoic acid	4.3	1.0	0.25	ug/kg	EPA 537M QSM5.3 B-15
Perfluorohexanoic acid	1.9	1.0	0.25	ug/kg	EPA 537M QSM5.3 B-15
Perfluoroheptanoic acid	1.3	1.0	0.25	ug/kg	EPA 537M QSM5.3 B-15
Perfluorooctanesulfonic acid	4.2	1.0	0.25	ug/kg	EPA 537M QSM5.3 B-15
6:2 Fluorotelomer sulfonate	2.7	1.0	0.25	ug/kg	EPA 537M QSM5.3 B-15

FC1128-2 DU-4B

Perfluorobutanoic acid	1.2	1.0	0.38	ug/kg	EPA 537M QSM5.3 B-15
Perfluoropentanoic acid	4.5	1.0	0.25	ug/kg	EPA 537M QSM5.3 B-15
Perfluorohexanoic acid	1.7	1.0	0.25	ug/kg	EPA 537M QSM5.3 B-15
Perfluoroheptanoic acid	1.1	1.0	0.25	ug/kg	EPA 537M QSM5.3 B-15
Perfluorooctanesulfonic acid	2.4	1.0	0.25	ug/kg	EPA 537M QSM5.3 B-15
6:2 Fluorotelomer sulfonate	1.7	1.0	0.25	ug/kg	EPA 537M QSM5.3 B-15

FC1128-3 DU-2

Perfluorobutanoic acid	5.6	1.0	0.38	ug/kg	EPA 537M QSM5.3 B-15
Perfluoropentanoic acid	1.8	1.0	0.25	ug/kg	EPA 537M QSM5.3 B-15
Perfluorohexanoic acid	14.2	1.0	0.25	ug/kg	EPA 537M QSM5.3 B-15
Perfluoroheptanoic acid	0.44 J	1.0	0.25	ug/kg	EPA 537M QSM5.3 B-15
Perfluorooctanesulfonic acid	0.35 J	1.0	0.25	ug/kg	EPA 537M QSM5.3 B-15
4:2 Fluorotelomer sulfonate	1.1	1.0	0.25	ug/kg	EPA 537M QSM5.3 B-15
6:2 Fluorotelomer sulfonate	113	5.1	1.3	ug/kg	EPA 537M QSM5.3 B-15

FC1128-4 DU-5

Perfluorobutanoic acid	2.7	1.0	0.38	ug/kg	EPA 537M QSM5.3 B-15
Perfluoropentanoic acid	3.1	1.0	0.25	ug/kg	EPA 537M QSM5.3 B-15
Perfluorohexanoic acid	6.7	1.0	0.25	ug/kg	EPA 537M QSM5.3 B-15
Perfluoroheptanoic acid	1.1	1.0	0.25	ug/kg	EPA 537M QSM5.3 B-15
Perfluorooctanesulfonic acid	0.96 J	1.0	0.25	ug/kg	EPA 537M QSM5.3 B-15
4:2 Fluorotelomer sulfonate	2.0	1.0	0.25	ug/kg	EPA 537M QSM5.3 B-15
6:2 Fluorotelomer sulfonate ^a	115	5.1	1.3	ug/kg	EPA 537M QSM5.3 B-15

FC1128-4A DU-5

Perfluorobutanoic acid	3.3	1.0	0.39	ug/kg	EPA 537M QSM5.3 B-15
Perfluoropentanoic acid	3.5	1.0	0.26	ug/kg	EPA 537M QSM5.3 B-15
Perfluorohexanoic acid	7.4	1.0	0.26	ug/kg	EPA 537M QSM5.3 B-15
Perfluoroheptanoic acid	1.2	1.0	0.26	ug/kg	EPA 537M QSM5.3 B-15
Perfluorooctanesulfonic acid	1.1	1.0	0.26	ug/kg	EPA 537M QSM5.3 B-15

Summary of Hits

Job Number: FC1128
Account: Tetra Tech
Project: Red Hill AFFF; HI
Collected: 12/02/22



Lab Sample ID	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
4:2 Fluorotelomer sulfonate		2.3	1.0	0.26	ug/kg	EPA 537M QSM5.3 B-15
6:2 Fluorotelomer sulfonate		159	51	13	ug/kg	EPA 537M QSM5.3 B-15
FC1128-4B DU-5						
Perfluorobutanoic acid		3.7	1.0	0.39	ug/kg	EPA 537M QSM5.3 B-15
Perfluoropentanoic acid		4.0	1.0	0.26	ug/kg	EPA 537M QSM5.3 B-15
Perfluorohexanoic acid		8.3	1.0	0.26	ug/kg	EPA 537M QSM5.3 B-15
Perfluoroheptanoic acid		1.3	1.0	0.26	ug/kg	EPA 537M QSM5.3 B-15
Perfluorooctanesulfonic acid		1.3	1.0	0.26	ug/kg	EPA 537M QSM5.3 B-15
4:2 Fluorotelomer sulfonate		2.7	1.0	0.26	ug/kg	EPA 537M QSM5.3 B-15
6:2 Fluorotelomer sulfonate		127	5.1	1.3	ug/kg	EPA 537M QSM5.3 B-15

(a) Dilution required (ID recovery standard failure).

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	DU-4A	Date Sampled:	12/02/22
Lab Sample ID:	FC1128-1	Date Received:	12/08/22
Matrix:	SO - Soil	Percent Solids:	n/a ^a
Method:	EPA 537M QSM5.3 B-15 IN HOUSE		
Project:	Red Hill AFFF; HI		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q98059.D	1	12/16/22 18:13	AL	12/12/22 13:30	OP94484	SQ2095
Run #2							

Run #	Initial Weight	Final Volume
Run #1	1.98 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYL CARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	1.3	1.0	0.38	ug/kg	
2706-90-3	Perfluoropentanoic acid	4.3	1.0	0.25	ug/kg	
307-24-4	Perfluorohexanoic acid	1.9	1.0	0.25	ug/kg	
375-85-9	Perfluoroheptanoic acid	1.3	1.0	0.25	ug/kg	
335-67-1	Perfluorooctanoic acid	ND	1.0	0.25	ug/kg	
375-95-1	Perfluorononanoic acid	ND	1.0	0.25	ug/kg	
335-76-2	Perfluorodecanoic acid	ND	1.0	0.25	ug/kg	
2058-94-8	Perfluoroundecanoic acid	ND	1.0	0.25	ug/kg	
307-55-1	Perfluorododecanoic acid	ND	1.0	0.25	ug/kg	
72629-94-8	Perfluorotridecanoic acid	ND	1.0	0.27	ug/kg	
376-06-7	Perfluorotetradecanoic acid	ND	1.0	0.25	ug/kg	
PERFLUOROALKYL SULFONIC ACIDS						
375-73-5	Perfluorobutanesulfonic acid	ND	1.0	0.25	ug/kg	
2706-91-4	Perfluoropentanesulfonic acid	ND	1.0	0.25	ug/kg	
355-46-4	Perfluorohexanesulfonic acid	ND	1.0	0.25	ug/kg	
375-92-8	Perfluoroheptanesulfonic acid	ND	1.0	0.25	ug/kg	
1763-23-1	Perfluorooctanesulfonic acid	4.2	1.0	0.25	ug/kg	
68259-12-1	Perfluorononanesulfonic acid	ND	1.0	0.25	ug/kg	
335-77-3	Perfluorodecanesulfonic acid	ND	1.0	0.25	ug/kg	
PERFLUORO OCTANESULFONAMIDES						
754-91-6	PFOSA	ND	1.0	0.25	ug/kg	
PERFLUORO OCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	1.0	0.25	ug/kg	
2991-50-6	EtFOSAA	ND	1.0	0.25	ug/kg	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	1.0	0.25	ug/kg	
27619-97-2	6:2 Fluorotelomer sulfonate	2.7	1.0	0.25	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: DU-4A		Date Sampled: 12/02/22
Lab Sample ID: FC1128-1		Date Received: 12/08/22
Matrix: SO - Soil		Percent Solids: n/a ^a
Method: EPA 537M QSM5.3 B-15 IN HOUSE		
Project: Red Hill AFFF; HI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	1.0	0.25	ug/kg	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	61%		50-150%
	13C5-PFPeA	62%		50-150%
	13C5-PFHxA	62%		50-150%
	13C4-PFHpA	64%		50-150%
	13C8-PFOA	63%		50-150%
	13C9-PFNA	65%		50-150%
	13C6-PFDA	61%		50-150%
	13C7-PFUnDA	58%		50-150%
	13C2-PFDoDA	52%		50-150%
	13C2-PFTeDA	54%		50-150%
	13C3-PFBS	65%		50-150%
	13C3-PFHxS	63%		50-150%
	13C8-PFOS	61%		50-150%
	13C8-FOSA	58%		50-150%
	d3-MeFOSAA	63%		50-150%
	d5-EtFOSAA	64%		50-150%
	13C2-4:2FTS	58%		50-150%
	13C2-6:2FTS	63%		50-150%
	13C2-8:2FTS	62%		50-150%

(a) Sample was dried prior to analysis.

ND = Not detected	MDL = Method Detection Limit	J = Indicates an estimated value
RL = Reporting Limit		B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range		N = Indicates presumptive evidence of a compound

4.1
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Report of Analysis

Client Sample ID:	DU-4B	Date Sampled:	12/02/22
Lab Sample ID:	FC1128-2	Date Received:	12/08/22
Matrix:	SO - Soil	Percent Solids:	n/a ^a
Method:	EPA 537M QSM5.3 B-15 IN HOUSE		
Project:	Red Hill AFFF; HI		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q98062.D	1	12/16/22 18:58	AL	12/12/22 13:30	OP94484	SQ2095
Run #2 ^b	Q98134.D	5	12/19/22 18:42	AL	12/12/22 13:30	OP94484	SQ2096

Run #	Initial Weight	Final Volume
Run #1	1.98 g	1.0 ml
Run #2	1.98 g	1.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYL CARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	1.2	1.0	0.38	ug/kg	
2706-90-3	Perfluoropentanoic acid	4.5	1.0	0.25	ug/kg	
307-24-4	Perfluorohexanoic acid	1.7	1.0	0.25	ug/kg	
375-85-9	Perfluoroheptanoic acid	1.1	1.0	0.25	ug/kg	
335-67-1	Perfluorooctanoic acid	ND	1.0	0.25	ug/kg	
375-95-1	Perfluorononanoic acid	ND	1.0	0.25	ug/kg	
335-76-2	Perfluorodecanoic acid	ND	1.0	0.25	ug/kg	
2058-94-8	Perfluoroundecanoic acid	ND	1.0	0.25	ug/kg	
307-55-1	Perfluorododecanoic acid	ND ^c	5.1	1.3	ug/kg	
72629-94-8	Perfluorotridecanoic acid	ND ^c	5.1	1.3	ug/kg	
376-06-7	Perfluorotetradecanoic acid	ND ^c	5.1	1.3	ug/kg	
PERFLUOROALKYL SULFONIC ACIDS						
375-73-5	Perfluorobutanesulfonic acid	ND	1.0	0.25	ug/kg	
2706-91-4	Perfluoropentanesulfonic acid	ND	1.0	0.25	ug/kg	
355-46-4	Perfluorohexanesulfonic acid	ND	1.0	0.25	ug/kg	
375-92-8	Perfluoroheptanesulfonic acid	ND	1.0	0.25	ug/kg	
1763-23-1	Perfluorooctanesulfonic acid	2.4	1.0	0.25	ug/kg	
68259-12-1	Perfluorononanesulfonic acid	ND	1.0	0.25	ug/kg	
335-77-3	Perfluorodecanesulfonic acid	ND	1.0	0.25	ug/kg	
PERFLUORO OCTANESULFONAMIDES						
754-91-6	PFOSA	ND	1.0	0.25	ug/kg	
PERFLUORO OCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	1.0	0.25	ug/kg	
2991-50-6	EtFOSAA	ND	1.0	0.25	ug/kg	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	1.0	0.25	ug/kg	
27619-97-2	6:2 Fluorotelomer sulfonate	1.7	1.0	0.25	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: DU-4B		Date Sampled: 12/02/22
Lab Sample ID: FC1128-2		Date Received: 12/08/22
Matrix: SO - Soil		Percent Solids: n/a ^a
Method: EPA 537M QSM5.3 B-15 IN HOUSE		
Project: Red Hill AFFF; HI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	1.0	0.25	ug/kg	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	56%	55%	50-150%
	13C5-PFPeA	56%	55%	50-150%
	13C5-PFHxA	58%	56%	50-150%
	13C4-PFHpA	58%	56%	50-150%
	13C8-PFOA	58%	56%	50-150%
	13C9-PFNA	59%	58%	50-150%
	13C6-PFDA	55%	59%	50-150%
	13C7-PFUnDA	53%	58%	50-150%
	13C2-PFDoDA	48% ^d	53%	50-150%
	13C2-PFTeDA	49% ^d	54%	50-150%
	13C3-PFBS	58%	59%	50-150%
	13C3-PFHxS	58%	59%	50-150%
	13C8-PFOS	57%	57%	50-150%
	13C8-FOSA	57%	56%	50-150%
	d3-MeFOSAA	57%	67%	50-150%
	d5-EtFOSAA	60%	69%	50-150%
	13C2-4:2FTS	52%	52%	50-150%
	13C2-6:2FTS	56%	55%	50-150%
	13C2-8:2FTS	57%	56%	50-150%

- (a) Sample was dried prior to analysis.
- (b) Dilution required (ID recovery standard failure).
- (c) Result is from Run# 2
- (d) Outside control limits.

ND = Not detected	MDL = Method Detection Limit	J = Indicates an estimated value
RL = Reporting Limit		B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range		N = Indicates presumptive evidence of a compound

4.2
4

Report of Analysis

Client Sample ID:	DU-2	Date Sampled:	12/02/22
Lab Sample ID:	FC1128-3	Date Received:	12/08/22
Matrix:	SO - Soil	Percent Solids:	n/a ^a
Method:	EPA 537M QSM5.3 B-15 IN HOUSE		
Project:	Red Hill AFFF; HI		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q98063.D	1	12/16/22 19:13	AL	12/12/22 13:30	OP94484	SQ2095
Run #2	Q98135.D	5	12/19/22 18:57	AL	12/12/22 13:30	OP94484	SQ2096
Run #3 ^b	4Q38100.D	1	12/21/22 18:14	MV	12/21/22 09:00	OP94647	S4Q548
Run #4 ^b	4Q38101.D	5	12/21/22 18:29	MV	12/21/22 09:00	OP94647	S4Q548

Run #	Initial Weight	Final Volume
Run #1	1.98 g	1.0 ml
Run #2	1.98 g	1.0 ml
Run #3	2.01 g	1.0 ml
Run #4	2.01 g	1.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYL CARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	5.6	1.0	0.38	ug/kg	
2706-90-3	Perfluoropentanoic acid	1.8	1.0	0.25	ug/kg	
307-24-4	Perfluorohexanoic acid	14.2	1.0	0.25	ug/kg	
375-85-9	Perfluoroheptanoic acid	0.44	1.0	0.25	ug/kg	J
335-67-1	Perfluorooctanoic acid	ND ^c	5.1	1.3	ug/kg	
375-95-1	Perfluorononanoic acid	ND ^c	5.1	1.3	ug/kg	
335-76-2	Perfluorodecanoic acid ^d	ND ^c	5.1	1.3	ug/kg	
2058-94-8	Perfluoroundecanoic acid	ND	1.0	0.25	ug/kg	
307-55-1	Perfluorododecanoic acid	ND	1.0	0.25	ug/kg	
72629-94-8	Perfluorotridecanoic acid	ND	1.0	0.27	ug/kg	
376-06-7	Perfluorotetradecanoic acid	ND	1.0	0.25	ug/kg	
PERFLUOROALKYLSULFONIC ACIDS						
375-73-5	Perfluorobutanesulfonic acid	ND	1.0	0.25	ug/kg	
2706-91-4	Perfluoropentanesulfonic acid	ND	1.0	0.25	ug/kg	
355-46-4	Perfluorohexanesulfonic acid	ND	1.0	0.25	ug/kg	
375-92-8	Perfluoroheptanesulfonic acid	ND	1.0	0.25	ug/kg	
1763-23-1	Perfluorooctanesulfonic acid	0.35	1.0	0.25	ug/kg	J
68259-12-1	Perfluorononanesulfonic acid	ND	1.0	0.25	ug/kg	
335-77-3	Perfluorodecanesulfonic acid	ND	1.0	0.25	ug/kg	
PERFLUORO OCTANESULFONAMIDES						
754-91-6	PFOSA	ND ^c	5.1	1.3	ug/kg	
PERFLUORO OCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA ^d	ND ^c	5.1	1.3	ug/kg	
2991-50-6	EtFOSAA	ND	1.0	0.25	ug/kg	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: DU-2		Date Sampled: 12/02/22
Lab Sample ID: FC1128-3		Date Received: 12/08/22
Matrix: SO - Soil		Percent Solids: n/a ^a
Method: EPA 537M QSM5.3 B-15 IN HOUSE		
Project: Red Hill AFFF; HI		

CAS No.	Compound	Result	RL	MDL	Units	Q
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	1.1	1.0	0.25	ug/kg	
27619-97-2	6:2 Fluorotelomer sulfonate	113 ^c	5.1	1.3	ug/kg	
39108-34-4	8:2 Fluorotelomer sulfonate ^d	ND ^c	5.1	1.3	ug/kg	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Run# 3	Limits
	13C4-PFBA	65%	64%	69%	50-150%
	13C5-PFPeA	66%	64%	73%	50-150%
	13C5-PFHxA	65%	65%	75%	50-150%
	13C4-PFHpA	65%	65%	72%	50-150%
	13C8-PFOA	25% ^e	53%	30% ^e	50-150%
	13C9-PFNA	27% ^e	65%	11% ^e	50-150%
	13C6-PFDA	7% ^e	20% ^e	8% ^e	50-150%
	13C7-PFUnDA	59%	58%	79%	50-150%
	13C2-PFDoDA	57%	59%	60%	50-150%
	13C2-PFTeDA	59%	62%	55%	50-150%
	13C3-PFBS	66%	67%	80%	50-150%
	13C3-PFHxS	63%	63%	75%	50-150%
	13C8-PFOS	54%	65%	36% ^e	50-150%
	13C8-FOSA	0% ^e	73%	0% ^e	50-150%
	d3-MeFOSAA	40% ^e	36% ^e	92%	50-150%
	d5-EtFOSAA	67%	81%	86%	50-150%
	13C2-4:2FTS	61%	60%	70%	50-150%
	13C2-6:2FTS	80%	127%	103%	50-150%
	13C2-8:2FTS	8% ^e	25% ^e	17% ^e	50-150%

- (a) Sample was dried prior to analysis.
- (b) Confirmation run.
- (c) Result is from Run# 2
- (d) Associated ID Standard outside control limits.
- (e) Outside control limits.

ND = Not detected	MDL = Method Detection Limit	J = Indicates an estimated value
RL = Reporting Limit		B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range		N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	DU-5	Date Sampled:	12/02/22
Lab Sample ID:	FC1128-4	Date Received:	12/08/22
Matrix:	SO - Soil	Percent Solids:	n/a ^a
Method:	EPA 537M QSM5.3 B-15 IN HOUSE		
Project:	Red Hill AFFF; HI		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q98136.D	1	12/19/22 19:12	AL	12/12/22 13:30	OP94484	SQ2096
Run #2 ^b	Q98137.D	5	12/19/22 19:27	AL	12/12/22 13:30	OP94484	SQ2096
Run #3	Q98138.D	20	12/19/22 19:42	AL	12/12/22 13:30	OP94484	SQ2096

Run #	Initial Weight	Final Volume
Run #1	1.98 g	1.0 ml
Run #2	1.98 g	1.0 ml
Run #3	1.98 g	1.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYL CARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	2.7	1.0	0.38	ug/kg	
2706-90-3	Perfluoropentanoic acid	3.1	1.0	0.25	ug/kg	
307-24-4	Perfluorohexanoic acid	6.7	1.0	0.25	ug/kg	
375-85-9	Perfluoroheptanoic acid	1.1	1.0	0.25	ug/kg	
335-67-1	Perfluorooctanoic acid	ND ^c	5.1	1.3	ug/kg	
375-95-1	Perfluorononanoic acid	ND	1.0	0.25	ug/kg	
335-76-2	Perfluorodecanoic acid ^d	ND ^e	20	5.1	ug/kg	
2058-94-8	Perfluoroundecanoic acid	ND	1.0	0.25	ug/kg	
307-55-1	Perfluorododecanoic acid	ND ^c	5.1	1.3	ug/kg	
72629-94-8	Perfluorotridecanoic acid	ND ^c	5.1	1.3	ug/kg	
376-06-7	Perfluorotetradecanoic acid	ND ^c	5.1	1.3	ug/kg	
PERFLUOROALKYL SULFONIC ACIDS						
375-73-5	Perfluorobutanesulfonic acid	ND	1.0	0.25	ug/kg	
2706-91-4	Perfluoropentanesulfonic acid	ND	1.0	0.25	ug/kg	
355-46-4	Perfluorohexanesulfonic acid	ND	1.0	0.25	ug/kg	
375-92-8	Perfluoroheptanesulfonic acid	ND	1.0	0.25	ug/kg	
1763-23-1	Perfluorooctanesulfonic acid	0.96	1.0	0.25	ug/kg	J
68259-12-1	Perfluorononanesulfonic acid	ND	1.0	0.25	ug/kg	
335-77-3	Perfluorodecanesulfonic acid	ND	1.0	0.25	ug/kg	
PERFLUORO OCTANESULFONAMIDES						
754-91-6	PFOSA	ND	1.0	0.25	ug/kg	
PERFLUORO OCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND ^e	20	5.1	ug/kg	
2991-50-6	EtFOSAA	ND	1.0	0.25	ug/kg	

FLUOROTELOMER SULFONATES

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: DU-5		Date Sampled: 12/02/22
Lab Sample ID: FC1128-4		Date Received: 12/08/22
Matrix: SO - Soil		Percent Solids: n/a ^a
Method: EPA 537M QSM5.3 B-15 IN HOUSE		
Project: Red Hill AFFF; HI		

CAS No.	Compound	Result	RL	MDL	Units	Q
757124-72-4	4:2 Fluorotelomer sulfonate	2.0	1.0	0.25	ug/kg	
27619-97-2	6:2 Fluorotelomer sulfonate	115 ^c	5.1	1.3	ug/kg	
39108-34-4	8:2 Fluorotelomer sulfonate	ND ^e	20	5.1	ug/kg	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Run# 3	Limits
	13C4-PFBA	60%	58%	58%	50-150%
	13C5-PFPeA	61%	57%	58%	50-150%
	13C5-PFHxA	61%	59%	59%	50-150%
	13C4-PFHpA	61%	59%	58%	50-150%
	13C8-PFOA	38% ^f	55%	59%	50-150%
	13C9-PFNA	59%	60%	60%	50-150%
	13C6-PFDA	18% ^f	36% ^f	49% ^f	50-150%
	13C7-PFUnDA	51%	57%	58%	50-150%
	13C2-PFDoDA	40% ^f	52%	56%	50-150%
	13C2-PFTeDA	40% ^f	51%	55%	50-150%
	13C3-PFBS	63%	63%	60%	50-150%
	13C3-PFHxS	60%	57%	62%	50-150%
	13C8-PFOS	62%	62%	62%	50-150%
	13C8-FOSA	63%	66%	69%	50-150%
	d3-MeFOSAA	31% ^f	36% ^f	50%	50-150%
	d5-EtFOSAA	68%	71%	73%	50-150%
	13C2-4:2FTS	57%	55%	55%	50-150%
	13C2-6:2FTS	91%	141%	143%	50-150%
	13C2-8:2FTS	22% ^f	39% ^f	50%	50-150%

- (a) Sample was dried prior to analysis.
- (b) Dilution required (ID recovery standard failure).
- (c) Result is from Run# 2
- (d) Associated ID Standard outside control limits.
- (e) Result is from Run# 3
- (f) Outside control limits.

ND = Not detected	MDL = Method Detection Limit	J = Indicates an estimated value
RL = Reporting Limit		B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range		N = Indicates presumptive evidence of a compound

4.4
4

Report of Analysis

Client Sample ID: DU-5		Date Sampled: 12/02/22
Lab Sample ID: FC1128-4A		Date Received: 12/08/22
Matrix: SO - Soil		Percent Solids: n/a ^a
Method: EPA 537M QSM5.3 B-15 IN HOUSE		
Project: Red Hill AFFF; HI		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q98140.D	1	12/19/22 20:12	AL	12/12/22 13:30	OP94484	SQ2096
Run #2	Q98141.D	5	12/19/22 20:27	AL	12/12/22 13:30	OP94484	SQ2096
Run #3	Q98065.D	20	12/16/22 19:43	AL	12/12/22 13:30	OP94484	SQ2095
Run #4	Q98142.D	50	12/19/22 20:41	AL	12/12/22 13:30	OP94484	SQ2096

Run #	Initial Weight	Final Volume
Run #1	1.96 g	1.0 ml
Run #2	1.96 g	1.0 ml
Run #3	1.96 g	1.0 ml
Run #4	1.96 g	1.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYL CARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	3.3	1.0	0.39	ug/kg	
2706-90-3	Perfluoropentanoic acid	3.5	1.0	0.26	ug/kg	
307-24-4	Perfluorohexanoic acid	7.4	1.0	0.26	ug/kg	
375-85-9	Perfluoroheptanoic acid	1.2	1.0	0.26	ug/kg	
335-67-1	Perfluorooctanoic acid	ND ^b	5.1	1.3	ug/kg	
375-95-1	Perfluorononanoic acid	ND	1.0	0.26	ug/kg	
335-76-2	Perfluorodecanoic acid	ND ^c	20	5.1	ug/kg	
2058-94-8	Perfluoroundecanoic acid	ND ^b	5.1	1.3	ug/kg	
307-55-1	Perfluorododecanoic acid	ND ^b	5.1	1.3	ug/kg	
72629-94-8	Perfluorotridecanoic acid	ND ^b	5.1	1.4	ug/kg	
376-06-7	Perfluorotetradecanoic acid	ND ^b	5.1	1.3	ug/kg	
PERFLUOROALKYL SULFONIC ACIDS						
375-73-5	Perfluorobutanesulfonic acid	ND	1.0	0.26	ug/kg	
2706-91-4	Perfluoropentanesulfonic acid	ND	1.0	0.26	ug/kg	
355-46-4	Perfluorohexanesulfonic acid	ND	1.0	0.26	ug/kg	
375-92-8	Perfluoroheptanesulfonic acid	ND	1.0	0.26	ug/kg	
1763-23-1	Perfluorooctanesulfonic acid	1.1	1.0	0.26	ug/kg	
68259-12-1	Perfluorononanesulfonic acid	ND	1.0	0.26	ug/kg	
335-77-3	Perfluorodecanesulfonic acid	ND ^b	5.1	1.3	ug/kg	
PERFLUORO OCTANESULFONAMIDES						
754-91-6	PFOSA	ND	1.0	0.26	ug/kg	
PERFLUORO OCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND ^c	20	5.1	ug/kg	
2991-50-6	EtFOSAA	ND	1.0	0.26	ug/kg	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
 RL = Reporting Limit B = Indicates analyte found in associated method blank
 E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

4.5
4

Report of Analysis

Client Sample ID: DU-5		
Lab Sample ID: FC1128-4A		Date Sampled: 12/02/22
Matrix: SO - Soil		Date Received: 12/08/22
Method: EPA 537M QSM5.3 B-15 IN HOUSE		Percent Solids: n/a ^a
Project: Red Hill AFFF; HI		

CAS No.	Compound	Result	RL	MDL	Units	Q
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	2.3	1.0	0.26	ug/kg	
27619-97-2	6:2 Fluorotelomer sulfonate	159 ^d	51	13	ug/kg	
39108-34-4	8:2 Fluorotelomer sulfonate	ND ^d	51	13	ug/kg	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Run# 3	Limits
	13C4-PFBA	61%	58%	58%	50-150%
	13C5-PFPeA	61%	59%	56%	50-150%
	13C5-PFHxA	63%	58%	58%	50-150%
	13C4-PFHpA	62%	60%	59%	50-150%
	13C8-PFOA	39% ^e	57%	60%	50-150%
	13C9-PFNA	61%	60%	59%	50-150%
	13C6-PFDA	16% ^e	34% ^e	46% ^e	50-150%
	13C7-PFUnDA	49% ^e	56%	56%	50-150%
	13C2-PFDoDA	37% ^e	51%	58%	50-150%
	13C2-PFTeDA	39% ^e	50%	58%	50-150%
	13C3-PFBS	64%	62%	62%	50-150%
	13C3-PFHxS	62%	60%	63%	50-150%
	13C8-PFOS	62%	60%	62%	50-150%
	13C8-FOSA	66%	70%	72%	50-150%
	d3-MeFOSAA	32% ^e	41% ^e	35% ^e	50-150%
	d5-EtFOSAA	65%	70%	55%	50-150%
	13C2-4:2FTS	59%	56%	52%	50-150%
	13C2-6:2FTS	100%	153% ^e	155% ^e	50-150%
	13C2-8:2FTS	20% ^e	35% ^e	42% ^e	50-150%

- (a) Sample was dried prior to analysis.
- (b) Result is from Run# 2
- (c) Result is from Run# 3
- (d) Result is from Run# 4
- (e) Outside control limits.

ND = Not detected	MDL = Method Detection Limit	J = Indicates an estimated value
RL = Reporting Limit		B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range		N = Indicates presumptive evidence of a compound

4.5
4

Report of Analysis

Client Sample ID:	DU-5	Date Sampled:	12/02/22
Lab Sample ID:	FC1128-4B	Date Received:	12/08/22
Matrix:	SO - Soil	Percent Solids:	n/a ^a
Method:	EPA 537M QSM5.3 B-15 IN HOUSE		
Project:	Red Hill AFFF; HI		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q98145.D	1	12/19/22 21:26	AL	12/12/22 13:30	OP94484	SQ2096
Run #2	Q98146.D	5	12/19/22 21:41	AL	12/12/22 13:30	OP94484	SQ2096
Run #3	Q98066.D	20	12/16/22 19:57	AL	12/12/22 13:30	OP94484	SQ2095

Run #	Initial Weight	Final Volume
Run #1	1.96 g	1.0 ml
Run #2	1.96 g	1.0 ml
Run #3	1.96 g	1.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYL CARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	3.7	1.0	0.39	ug/kg	
2706-90-3	Perfluoropentanoic acid	4.0	1.0	0.26	ug/kg	
307-24-4	Perfluorohexanoic acid	8.3	1.0	0.26	ug/kg	
375-85-9	Perfluoroheptanoic acid	1.3	1.0	0.26	ug/kg	
335-67-1	Perfluorooctanoic acid	ND ^b	5.1	1.3	ug/kg	
375-95-1	Perfluorononanoic acid	ND	1.0	0.26	ug/kg	
335-76-2	Perfluorodecanoic acid ^c	ND ^d	20	5.1	ug/kg	
2058-94-8	Perfluoroundecanoic acid	ND ^b	5.1	1.3	ug/kg	
307-55-1	Perfluorododecanoic acid	ND ^d	20	5.1	ug/kg	
72629-94-8	Perfluorotridecanoic acid	ND ^d	20	5.4	ug/kg	
376-06-7	Perfluorotetradecanoic acid	ND ^d	20	5.1	ug/kg	
PERFLUOROALKYL SULFONIC ACIDS						
375-73-5	Perfluorobutanesulfonic acid	ND	1.0	0.26	ug/kg	
2706-91-4	Perfluoropentanesulfonic acid	ND	1.0	0.26	ug/kg	
355-46-4	Perfluorohexanesulfonic acid	ND	1.0	0.26	ug/kg	
375-92-8	Perfluoroheptanesulfonic acid	ND	1.0	0.26	ug/kg	
1763-23-1	Perfluorooctanesulfonic acid	1.3	1.0	0.26	ug/kg	
68259-12-1	Perfluorononanesulfonic acid	ND	1.0	0.26	ug/kg	
335-77-3	Perfluorodecanesulfonic acid	ND ^b	5.1	1.3	ug/kg	
PERFLUORO OCTANESULFONAMIDES						
754-91-6	PFOSA	ND	1.0	0.26	ug/kg	
PERFLUORO OCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA ^c	ND ^d	20	5.1	ug/kg	
2991-50-6	EtFOSAA	ND	1.0	0.26	ug/kg	

FLUOROTELOMER SULFONATES

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: DU-5		Date Sampled: 12/02/22
Lab Sample ID: FC1128-4B		Date Received: 12/08/22
Matrix: SO - Soil		Percent Solids: n/a ^a
Method: EPA 537M QSM5.3 B-15 IN HOUSE		
Project: Red Hill AFFF; HI		

CAS No.	Compound	Result	RL	MDL	Units	Q
757124-72-4	4:2 Fluorotelomer sulfonate	2.7	1.0	0.26	ug/kg	
27619-97-2	6:2 Fluorotelomer sulfonate	127 ^b	5.1	1.3	ug/kg	
39108-34-4	8:2 Fluorotelomer sulfonate ^c	ND ^d	20	5.1	ug/kg	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Run# 3	Limits
	13C4-PFBA	54%	51%	50%	50-150%
	13C5-PFPeA	53%	51%	50%	50-150%
	13C5-PFHxA	54%	52%	52%	50-150%
	13C4-PFHpA	54%	54%	51%	50-150%
	13C8-PFOA	35% ^e	50%	53%	50-150%
	13C9-PFNA	52%	55%	55%	50-150%
	13C6-PFDA	14% ^e	30% ^e	43% ^e	50-150%
	13C7-PFUnDA	44% ^e	50%	51%	50-150%
	13C2-PFDoDA	34% ^e	46% ^e	51%	50-150%
	13C2-PFTeDA	36% ^e	46% ^e	52%	50-150%
	13C3-PFBS	56%	55%	55%	50-150%
	13C3-PFHxS	54%	55%	49% ^e	50-150%
	13C8-PFOS	52%	50%	49% ^e	50-150%
	13C8-FOSA	60%	64%	69%	50-150%
	d3-MeFOSAA	31% ^e	33% ^e	29% ^e	50-150%
	d5-EtFOSAA	57%	63%	48% ^e	50-150%
	13C2-4:2FTS	51%	49% ^e	48% ^e	50-150%
	13C2-6:2FTS	94%	143%	147%	50-150%
	13C2-8:2FTS	18% ^e	30% ^e	40% ^e	50-150%

- (a) Sample was dried prior to analysis.
- (b) Result is from Run# 2
- (c) Associated ID Standard outside control limits.
- (d) Result is from Run# 3
- (e) Outside control limits.

ND = Not detected	MDL = Method Detection Limit	J = Indicates an estimated value
RL = Reporting Limit		B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range		N = Indicates presumptive evidence of a compound

4.6
4

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody
- QC Evaluation: DOD QSM5.x Limits

TO: SGS-AK42
 4105 VINELAND RD, C15
 ORLANDO, FL 32811

Chain of Custody Record

FC1128

Regulatory Program: DW NPDES RCRA Other:

Client Contact Hawaii Dept. of Health, HEER 2385 Waimano Home Road #100 Pearl City, HI 96782 Phone: (808) 586-4249 Fax: (808) 586-7537 Project Name: Red Hill AFFF Site: P O #		Project Manager: Roger Brewer Tel/Fax: 1-808-586-4249		Site Contact: Lab Contact:		Date: 12/22	COC No:	
Analysis Turnaround Time <input checked="" type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS TAT if different from Below <input checked="" type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day		Sample Identification		Sample Date	Sample Time	Sample Type (M=Multi Increment, G=Grab)	Matrix	# of Cont.
① DU-4A		12/22	11:00a	MI	Soil	1		
② DU-4B		"	11:30am	MI	"	1		
③ DU-2		"	1:00pm	MI	"	1		
④ DU-5		"	7:55p	MI	Soil	1		
NOTE: DU-5 received from Army Skoude @ 8:45PM 12/22/22 Samples DU-5 procured from Navy/AECON by POM observing IDW sample collection						INITIAL ASSESSMENT:		
						LABEL VERIFICATION:		
						510001		
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other		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		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return to Client <input type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months				
Special Instructions/QC Requirements & Comments: * Multi-Increment sample processing required * CALL ROGER BREWER UPON RECEIPT TO CONFIRM ANALYSIS * * Test 10-gram subsample required		Custody Seal No.:		Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:		
Relinquished by:	Company: H2OH	Date/Time: 12/22/22	Received by:	Company: Tetra Tech	Date/Time: 12/22/22 1645			
Relinquished by:	Company: Tetra Tech	Date/Time: 12/22/22	Received by:	Company: SCS	Date/Time: 12/22/22 930			
Relinquished by:	Company: FedEx	Date/Time: 12/22/22	Received in Laboratory by:	Company:	Date/Time:			

5.1
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FC1128: Chain of Custody

Page 1 of 2

SGS Sample Receipt Summary

Job Number: FC1128

Client: HAWAII DEPT OF HEALTH, HEER

Project: RED HILL AFF

Date / Time Received: 12/8/2022 9:30:00 AM

Delivery Method: FEDEX

Airbill #'s: 7706 9752 2091

Therm ID: IR 1;	Therm CF: 0.2;	# of Coolers: 1
Cooler Temps (Raw Measured) °C: Cooler 1: (5.0);		
Cooler Temps (Corrected) °C: Cooler 1: (5.2);		

<u>Cooler Information</u>	<u>Y</u>	<u>or</u>	<u>N</u>
1. Custody Seals Present	<input checked="" type="checkbox"/>		<input type="checkbox"/>
2. Custody Seals Intact	<input checked="" type="checkbox"/>		<input type="checkbox"/>
3. Temp criteria achieved	<input checked="" type="checkbox"/>		<input type="checkbox"/>
4. Cooler temp verification	<u>IR Gun</u>		
5. Cooler media	<u>Ice (Bag)</u>		

<u>Trip Blank Information</u>	<u>Y</u>	<u>or</u>	<u>N</u>	<u>N/A</u>
1. Trip Blank present / cooler	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Trip Blank listed on COC	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>

<u>W</u>	<u>or</u>	<u>S</u>	<u>N/A</u>
3. Type Of TB Received		<input type="checkbox"/>	<input checked="" type="checkbox"/>

<u>Sample Information</u>	<u>Y</u>	<u>or</u>	<u>N</u>	<u>N/A</u>
1. Sample labels present on bottles	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
2. Samples preserved properly	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
3. Sufficient volume/containers recvd for analysis:	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
4. Condition of sample	<u>Intact</u>			
5. Sample recvd within HT	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
6. Dates/Times/IDs on COC match Sample Label	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
7. VOCs have headspace	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
8. Bottles received for unspecified tests	<input type="checkbox"/>		<input checked="" type="checkbox"/>	
9. Compositing instructions clear	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
10. Voa Soil Kits/Jars received past 48hrs?	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
11. % Solids Jar received?	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
12. Residual Chlorine Present?	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>

<u>Misc. Information</u>			
Number of Encores: 25-Gram _____	5-Gram _____	Number of 5035 Field Kits: _____	Number of Lab Filtered Metals: _____
Test Strip Lot #s: pH 0-3 _____	230315 _____	pH 10-12 _____	219813A _____
Residual Chlorine Test Strip Lot #: _____			

Comments

SM001 Rev. Date 05/24/17 Technician: SAMUELM Date: 12/8/2022 9:30:00 AM Reviewer: _____ Date: _____

5.1
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QC Evaluation: DOD QSM5.x Limits

Job Number: FC1128
 Account: Tetra Tech
 Project: Red Hill AFFF; HI
 Collected: 12/02/22

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
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OP94484 EPA 537M QSM5.3 B-15

OP94484-BS	375-22-4	Perfluorobutanoic acid	BSP	REC	94	%	71-135
OP94484-BS	2706-90-3	Perfluoropentanoic acid	BSP	REC	94	%	69-132
OP94484-BS	307-24-4	Perfluorohexanoic acid	BSP	REC	94	%	70-132
OP94484-BS	375-85-9	Perfluoroheptanoic acid	BSP	REC	98	%	71-131
OP94484-BS	335-67-1	Perfluorooctanoic acid	BSP	REC	95	%	69-133
OP94484-BS	375-95-1	Perfluorononanoic acid	BSP	REC	95	%	72-129
OP94484-BS	335-76-2	Perfluorodecanoic acid	BSP	REC	97	%	69-133
OP94484-BS	2058-94-8	Perfluoroundecanoic acid	BSP	REC	92	%	64-136
OP94484-BS	307-55-1	Perfluorododecanoic acid	BSP	REC	94	%	69-135
OP94484-BS	72629-94-8	Perfluorotridecanoic acid	BSP	REC	96	%	66-139
OP94484-BS	376-06-7	Perfluorotetradecanoic acid	BSP	REC	99	%	69-133
OP94484-BS	375-73-5	Perfluorobutanesulfonic acid	BSP	REC	96	%	72-128
OP94484-BS	2706-91-4	Perfluoropentanesulfonic acid	BSP	REC	94	%	73-123
OP94484-BS	355-46-4	Perfluorohexanesulfonic acid	BSP	REC	99	%	67-130
OP94484-BS	375-92-8	Perfluoroheptanesulfonic acid	BSP	REC	103	%	70-132
OP94484-BS	1763-23-1	Perfluorooctanesulfonic acid	BSP	REC	101	%	68-136
OP94484-BS	68259-12-1	Perfluorononanesulfonic acid	BSP	REC	100	%	69-125
OP94484-BS	335-77-3	Perfluorodecanesulfonic acid	BSP	REC	100	%	59-134
OP94484-BS	754-91-6	PFOSA	BSP	REC	87	%	67-137
OP94484-BS	2355-31-9	MeFOSAA	BSP	REC	96	%	63-144
OP94484-BS	2991-50-6	EtFOSAA	BSP	REC	97	%	61-139
OP94484-BS	757124-72-4	4:2 Fluorotelomer sulfonate	BSP	REC	99	%	62-145
OP94484-BS	27619-97-2	6:2 Fluorotelomer sulfonate	BSP	REC	99	%	64-140
OP94484-BS	39108-34-4	8:2 Fluorotelomer sulfonate	BSP	REC	101	%	65-137
OP94484-MS	375-22-4	Perfluorobutanoic acid	MS	REC	96	%	71-135
OP94484-MS	2706-90-3	Perfluoropentanoic acid	MS	REC	101	%	69-132
OP94484-MS	307-24-4	Perfluorohexanoic acid	MS	REC	97	%	70-132
OP94484-MS	375-85-9	Perfluoroheptanoic acid	MS	REC	101	%	71-131
OP94484-MS	335-67-1	Perfluorooctanoic acid	MS	REC	100	%	69-133
OP94484-MS	375-95-1	Perfluorononanoic acid	MS	REC	99	%	72-129
OP94484-MS	335-76-2	Perfluorodecanoic acid	MS	REC	100	%	69-133
OP94484-MS	2058-94-8	Perfluoroundecanoic acid	MS	REC	98	%	64-136
OP94484-MS	307-55-1	Perfluorododecanoic acid	MS	REC	99	%	69-135
OP94484-MS	72629-94-8	Perfluorotridecanoic acid	MS	REC	99	%	66-139
OP94484-MS	376-06-7	Perfluorotetradecanoic acid	MS	REC	101	%	69-133
OP94484-MS	375-73-5	Perfluorobutanesulfonic acid	MS	REC	99	%	72-128
OP94484-MS	2706-91-4	Perfluoropentanesulfonic acid	MS	REC	97	%	73-123
OP94484-MS	355-46-4	Perfluorohexanesulfonic acid	MS	REC	103	%	67-130
OP94484-MS	375-92-8	Perfluoroheptanesulfonic acid	MS	REC	107	%	70-132
OP94484-MS	1763-23-1	Perfluorooctanesulfonic acid	MS	REC	95	%	68-136
OP94484-MS	68259-12-1	Perfluorononanesulfonic acid	MS	REC	96	%	69-125
OP94484-MS	335-77-3	Perfluorodecanesulfonic acid	MS	REC	93	%	59-134

* Sample used for QC is not from job FC1128

5.2
5

QC Evaluation: DOD QSM5.x Limits

Job Number: FC1128
 Account: Tetra Tech
 Project: Red Hill AFFF; HI
 Collected: 12/02/22

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
OP94484-MS	754-91-6	PFOSA	MS	REC	90	%	67-137
OP94484-MS	2355-31-9	MeFOSAA	MS	REC	95	%	63-144
OP94484-MS	2991-50-6	EtFOSAA	MS	REC	97	%	61-139
OP94484-MS	757124-72-4	4:2 Fluorotelomer sulfonate	MS	REC	100	%	62-145
OP94484-MS	27619-97-2	6:2 Fluorotelomer sulfonate	MS	REC	100	%	64-140
OP94484-MS	39108-34-4	8:2 Fluorotelomer sulfonate	MS	REC	104	%	65-137
OP94484-MSD	375-22-4	Perfluorobutanoic acid	MSD	REC	100	%	71-135
OP94484-MSD	375-22-4	Perfluorobutanoic acid	MSD	RPD	5	%	30
OP94484-MSD	2706-90-3	Perfluoropentanoic acid	MSD	REC	104	%	69-132
OP94484-MSD	2706-90-3	Perfluoropentanoic acid	MSD	RPD	3	%	30
OP94484-MSD	307-24-4	Perfluorohexanoic acid	MSD	REC	101	%	70-132
OP94484-MSD	307-24-4	Perfluorohexanoic acid	MSD	RPD	5	%	30
OP94484-MSD	375-85-9	Perfluoroheptanoic acid	MSD	REC	103	%	71-131
OP94484-MSD	375-85-9	Perfluoroheptanoic acid	MSD	RPD	3	%	30
OP94484-MSD	335-67-1	Perfluorooctanoic acid	MSD	REC	100	%	69-133
OP94484-MSD	335-67-1	Perfluorooctanoic acid	MSD	RPD	2	%	30
OP94484-MSD	375-95-1	Perfluorononanoic acid	MSD	REC	99	%	72-129
OP94484-MSD	375-95-1	Perfluorononanoic acid	MSD	RPD	1	%	30
OP94484-MSD	335-76-2	Perfluorodecanoic acid	MSD	REC	102	%	69-133
OP94484-MSD	335-76-2	Perfluorodecanoic acid	MSD	RPD	4	%	30
OP94484-MSD	2058-94-8	Perfluoroundecanoic acid	MSD	REC	100	%	64-136
OP94484-MSD	2058-94-8	Perfluoroundecanoic acid	MSD	RPD	4	%	30
OP94484-MSD	307-55-1	Perfluorododecanoic acid	MSD	REC	101	%	69-135
OP94484-MSD	307-55-1	Perfluorododecanoic acid	MSD	RPD	4	%	30
OP94484-MSD	72629-94-8	Perfluorotridecanoic acid	MSD	REC	94	%	66-139
OP94484-MSD	72629-94-8	Perfluorotridecanoic acid	MSD	RPD	4	%	30
OP94484-MSD	376-06-7	Perfluorotetradecanoic acid	MSD	REC	103	%	69-133
OP94484-MSD	376-06-7	Perfluorotetradecanoic acid	MSD	RPD	4	%	30
OP94484-MSD	375-73-5	Perfluorobutanesulfonic acid	MSD	REC	102	%	72-128
OP94484-MSD	375-73-5	Perfluorobutanesulfonic acid	MSD	RPD	5	%	30
OP94484-MSD	2706-91-4	Perfluoropentanesulfonic acid	MSD	REC	103	%	73-123
OP94484-MSD	2706-91-4	Perfluoropentanesulfonic acid	MSD	RPD	8	%	30
OP94484-MSD	355-46-4	Perfluorohexanesulfonic acid	MSD	REC	105	%	67-130
OP94484-MSD	355-46-4	Perfluorohexanesulfonic acid	MSD	RPD	4	%	30
OP94484-MSD	375-92-8	Perfluoroheptanesulfonic acid	MSD	REC	111	%	70-132
OP94484-MSD	375-92-8	Perfluoroheptanesulfonic acid	MSD	RPD	5	%	30
OP94484-MSD	1763-23-1	Perfluorooctanesulfonic acid	MSD	REC	100	%	68-136
OP94484-MSD	1763-23-1	Perfluorooctanesulfonic acid	MSD	RPD	5	%	30
OP94484-MSD	68259-12-1	Perfluorononanesulfonic acid	MSD	REC	100	%	69-125
OP94484-MSD	68259-12-1	Perfluorononanesulfonic acid	MSD	RPD	6	%	30
OP94484-MSD	335-77-3	Perfluorodecanesulfonic acid	MSD	REC	98	%	59-134
OP94484-MSD	335-77-3	Perfluorodecanesulfonic acid	MSD	RPD	6	%	30
OP94484-MSD	754-91-6	PFOSA	MSD	REC	94	%	67-137
OP94484-MSD	754-91-6	PFOSA	MSD	RPD	5	%	30
OP94484-MSD	2355-31-9	MeFOSAA	MSD	REC	99	%	63-144

* Sample used for QC is not from job FC1128

5.2
5

QC Evaluation: DOD QSM5.x Limits

Job Number: FC1128
Account: Tetra Tech
Project: Red Hill AFFF; HI
Collected: 12/02/22

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
OP94484-MSD	2355-31-9	MeFOSAA	MSD	RPD	5	%	30
OP94484-MSD	2991-50-6	EtFOSAA	MSD	REC	100	%	61-139
OP94484-MSD	2991-50-6	EtFOSAA	MSD	RPD	5	%	30
OP94484-MSD	757124-72-4	4:2 Fluorotelomer sulfonate	MSD	REC	104	%	62-145
OP94484-MSD	757124-72-4	4:2 Fluorotelomer sulfonate	MSD	RPD	6	%	30
OP94484-MSD	27619-97-2	6:2 Fluorotelomer sulfonate	MSD	REC	99	%	64-140
OP94484-MSD	27619-97-2	6:2 Fluorotelomer sulfonate	MSD	RPD	0	%	30
OP94484-MSD	39108-34-4	8:2 Fluorotelomer sulfonate	MSD	REC	105	%	65-137
OP94484-MSD	39108-34-4	8:2 Fluorotelomer sulfonate	MSD	RPD	3	%	30

5.2
5

* Sample used for QC is not from job FC1128

MS Semi-volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Instrument Blank

Job Number: FC1128
 Account: TETRHH Tetra Tech
 Project: Red Hill AFFF; HI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
SQ2095-IBLK	Q98051.D	1	12/16/22	AL	n/a	n/a	SQ2095

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.3 B-15

FC1128-1, FC1128-2, FC1128-3, FC1128-4A, FC1128-4B

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	1.0	0.38	ug/kg	
2706-90-3	Perfluoropentanoic acid	ND	1.0	0.25	ug/kg	
307-24-4	Perfluorohexanoic acid	ND	1.0	0.25	ug/kg	
375-85-9	Perfluoroheptanoic acid	ND	1.0	0.25	ug/kg	
335-67-1	Perfluorooctanoic acid	ND	1.0	0.25	ug/kg	
375-95-1	Perfluorononanoic acid	ND	1.0	0.25	ug/kg	
335-76-2	Perfluorodecanoic acid	ND	1.0	0.25	ug/kg	
2058-94-8	Perfluoroundecanoic acid	ND	1.0	0.25	ug/kg	
307-55-1	Perfluorododecanoic acid	ND	1.0	0.25	ug/kg	
72629-94-8	Perfluorotridecanoic acid	ND	1.0	0.27	ug/kg	
376-06-7	Perfluorotetradecanoic acid	ND	1.0	0.25	ug/kg	
375-73-5	Perfluorobutanesulfonic acid	ND	1.0	0.25	ug/kg	
2706-91-4	Perfluoropentanesulfonic acid	ND	1.0	0.25	ug/kg	
355-46-4	Perfluorohexanesulfonic acid	ND	1.0	0.25	ug/kg	
375-92-8	Perfluoroheptanesulfonic acid	ND	1.0	0.25	ug/kg	
1763-23-1	Perfluorooctanesulfonic acid	ND	1.0	0.25	ug/kg	
68259-12-1	Perfluorononanesulfonic acid	ND	1.0	0.25	ug/kg	
335-77-3	Perfluorodecanesulfonic acid	ND	1.0	0.25	ug/kg	
754-91-6	PFOSA	ND	1.0	0.25	ug/kg	
2355-31-9	MeFOSAA	ND	1.0	0.25	ug/kg	
2991-50-6	EiFOSAA	ND	1.0	0.25	ug/kg	
757124-72-44:2	Fluorotelomer sulfonate	ND	1.0	0.25	ug/kg	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	1.0	0.25	ug/kg	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	1.0	0.25	ug/kg	

CAS No.	ID Standard Recoveries	Limits
	13C4-PFBA	95% 50-150%
	13C5-PFPeA	96% 50-150%
	13C5-PFHxA	97% 50-150%
	13C4-PFHpA	98% 50-150%
	13C8-PFOA	99% 50-150%
	13C9-PFNA	101% 50-150%
	13C6-PFDA	99% 50-150%
	13C7-PFUnDA	98% 50-150%

Instrument Blank

Job Number: FC1128
Account: TETRHH Tetra Tech
Project: Red Hill AFFF; HI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
SQ2095-IBLK	Q98051.D	1	12/16/22	AL	n/a	n/a	SQ2095

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.3 B-15

FC1128-1, FC1128-2, FC1128-3, FC1128-4A, FC1128-4B

CAS No.	ID Standard Recoveries	Limits
	13C2-PFDoDA	98% 50-150%
	13C2-PFTeDA	97% 50-150%
	13C3-PFBS	96% 50-150%
	13C3-PFHxS	96% 50-150%
	13C8-PFOS	100% 50-150%
	13C8-FOSA	109% 50-150%
	d3-MeFOSAA	102% 50-150%
	d5-EtFOSAA	98% 50-150%
	13C2-4:2FTS	90% 50-150%
	13C2-6:2FTS	94% 50-150%
	13C2-8:2FTS	91% 50-150%

6.1.1
6

Instrument Blank

Job Number: FC1128
 Account: TETRHH Tetra Tech
 Project: Red Hill AFFF; HI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
SQ2096-IBLK	Q98113.D	1	12/19/22	AL	n/a	n/a	SQ2096

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.3 B-15

FC1128-2, FC1128-3, FC1128-4, FC1128-4A, FC1128-4B

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	1.0	0.38	ug/kg	
2706-90-3	Perfluoropentanoic acid	ND	1.0	0.25	ug/kg	
307-24-4	Perfluorohexanoic acid	ND	1.0	0.25	ug/kg	
375-85-9	Perfluoroheptanoic acid	ND	1.0	0.25	ug/kg	
335-67-1	Perfluorooctanoic acid	ND	1.0	0.25	ug/kg	
375-95-1	Perfluorononanoic acid	ND	1.0	0.25	ug/kg	
335-76-2	Perfluorodecanoic acid	ND	1.0	0.25	ug/kg	
2058-94-8	Perfluoroundecanoic acid	ND	1.0	0.25	ug/kg	
307-55-1	Perfluorododecanoic acid	ND	1.0	0.25	ug/kg	
72629-94-8	Perfluorotridecanoic acid	ND	1.0	0.27	ug/kg	
376-06-7	Perfluorotetradecanoic acid	ND	1.0	0.25	ug/kg	
375-73-5	Perfluorobutanesulfonic acid	ND	1.0	0.25	ug/kg	
2706-91-4	Perfluoropentanesulfonic acid	ND	1.0	0.25	ug/kg	
355-46-4	Perfluorohexanesulfonic acid	ND	1.0	0.25	ug/kg	
375-92-8	Perfluoroheptanesulfonic acid	ND	1.0	0.25	ug/kg	
1763-23-1	Perfluorooctanesulfonic acid	ND	1.0	0.25	ug/kg	
68259-12-1	Perfluorononanesulfonic acid	ND	1.0	0.25	ug/kg	
335-77-3	Perfluorodecanesulfonic acid	ND	1.0	0.25	ug/kg	
754-91-6	PFOSA	ND	1.0	0.25	ug/kg	
2355-31-9	MeFOSAA	ND	1.0	0.25	ug/kg	
2991-50-6	EiFOSAA	ND	1.0	0.25	ug/kg	
757124-72-44:2	Fluorotelomer sulfonate	ND	1.0	0.25	ug/kg	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	1.0	0.25	ug/kg	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	1.0	0.25	ug/kg	

CAS No.	ID Standard Recoveries	Limits
	13C4-PFBA	94% 50-150%
	13C5-PFPeA	102% 50-150%
	13C5-PFHxA	104% 50-150%
	13C4-PFHpA	107% 50-150%
	13C8-PFOA	106% 50-150%
	13C9-PFNA	100% 50-150%
	13C6-PFDA	100% 50-150%
	13C7-PFUnDA	94% 50-150%

Instrument Blank

Job Number: FC1128
Account: TETRHH Tetra Tech
Project: Red Hill AFFF; HI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
SQ2096-IBLK	Q98113.D	1	12/19/22	AL	n/a	n/a	SQ2096

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.3 B-15

FC1128-2, FC1128-3, FC1128-4, FC1128-4A, FC1128-4B

CAS No.	ID Standard Recoveries	Limits
	13C2-PFDoDA	90% 50-150%
	13C2-PFTeDA	91% 50-150%
	13C3-PFBS	98% 50-150%
	13C3-PFHxS	100% 50-150%
	13C8-PFOS	101% 50-150%
	13C8-FOSA	99% 50-150%
	d3-MeFOSAA	122% 50-150%
	d5-EtFOSAA	122% 50-150%
	13C2-4:2FTS	99% 50-150%
	13C2-6:2FTS	96% 50-150%
	13C2-8:2FTS	93% 50-150%

6.12

6

Method Blank Summary

Job Number: FC1128
 Account: TETRHH Tetra Tech
 Project: Red Hill AFFF; HI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP94484-MB	Q98058.D	1	12/16/22	AL	12/12/22	OP94484	SQ2095

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.3 B-15

FC1128-1, FC1128-2, FC1128-3, FC1128-4, FC1128-4A, FC1128-4B

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	1.0	0.38	ug/kg	
2706-90-3	Perfluoropentanoic acid	ND	1.0	0.25	ug/kg	
307-24-4	Perfluorohexanoic acid	ND	1.0	0.25	ug/kg	
375-85-9	Perfluoroheptanoic acid	ND	1.0	0.25	ug/kg	
335-67-1	Perfluorooctanoic acid	ND	1.0	0.25	ug/kg	
375-95-1	Perfluorononanoic acid	ND	1.0	0.25	ug/kg	
335-76-2	Perfluorodecanoic acid	ND	1.0	0.25	ug/kg	
2058-94-8	Perfluoroundecanoic acid	ND	1.0	0.25	ug/kg	
307-55-1	Perfluorododecanoic acid	ND	1.0	0.25	ug/kg	
72629-94-8	Perfluorotridecanoic acid	ND	1.0	0.27	ug/kg	
376-06-7	Perfluorotetradecanoic acid	ND	1.0	0.25	ug/kg	
375-73-5	Perfluorobutanesulfonic acid	ND	1.0	0.25	ug/kg	
2706-91-4	Perfluoropentanesulfonic acid	ND	1.0	0.25	ug/kg	
355-46-4	Perfluorohexanesulfonic acid	ND	1.0	0.25	ug/kg	
375-92-8	Perfluoroheptanesulfonic acid	ND	1.0	0.25	ug/kg	
1763-23-1	Perfluorooctanesulfonic acid	ND	1.0	0.25	ug/kg	
68259-12-1	Perfluorononanesulfonic acid	ND	1.0	0.25	ug/kg	
335-77-3	Perfluorodecanesulfonic acid	ND	1.0	0.25	ug/kg	
754-91-6	PFOSA	ND	1.0	0.25	ug/kg	
2355-31-9	MeFOSAA	ND	1.0	0.25	ug/kg	
2991-50-6	EiFOSAA	ND	1.0	0.25	ug/kg	
757124-72-44:2	Fluorotelomer sulfonate	ND	1.0	0.25	ug/kg	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	1.0	0.25	ug/kg	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	1.0	0.25	ug/kg	

CAS No.	ID Standard Recoveries	Limits
	13C4-PFBA	74% 50-150%
	13C5-PFPeA	74% 50-150%
	13C5-PFHxA	75% 50-150%
	13C4-PFHpA	76% 50-150%
	13C8-PFOA	75% 50-150%
	13C9-PFNA	77% 50-150%
	13C6-PFDA	76% 50-150%
	13C7-PFUnDA	75% 50-150%

Method Blank Summary

Job Number: FC1128
Account: TETRHH Tetra Tech
Project: Red Hill AFFF; HI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP94484-MB	Q98058.D	1	12/16/22	AL	12/12/22	OP94484	SQ2095

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.3 B-15

FC1128-1, FC1128-2, FC1128-3, FC1128-4, FC1128-4A, FC1128-4B

CAS No.	ID Standard Recoveries	Limits
	13C2-PFDoDA	73% 50-150%
	13C2-PFTeDA	74% 50-150%
	13C3-PFBS	74% 50-150%
	13C3-PFHxS	73% 50-150%
	13C8-PFOS	75% 50-150%
	13C8-FOSA	83% 50-150%
	d3-MeFOSAA	84% 50-150%
	d5-EtFOSAA	75% 50-150%
	13C2-4:2FTS	69% 50-150%
	13C2-6:2FTS	73% 50-150%
	13C2-8:2FTS	71% 50-150%

6.1.3

6

Blank Spike Summary

Job Number: FC1128
 Account: TETRHH Tetra Tech
 Project: Red Hill AFFF; HI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP94484-BS	Q98057.D	1	12/16/22	AL	12/12/22	OP94484	SQ2095

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.3 B-15

FC1128-1, FC1128-2, FC1128-3, FC1128-4, FC1128-4A, FC1128-4B

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
375-22-4	Perfluorobutanoic acid	10	9.4	94	71-135
2706-90-3	Perfluoropentanoic acid	10	9.4	94	69-132
307-24-4	Perfluorohexanoic acid	10	9.4	94	70-132
375-85-9	Perfluoroheptanoic acid	10	9.8	98	71-131
335-67-1	Perfluorooctanoic acid	10	9.5	95	69-133
375-95-1	Perfluorononanoic acid	10	9.5	95	72-129
335-76-2	Perfluorodecanoic acid	10	9.7	97	69-133
2058-94-8	Perfluoroundecanoic acid	10	9.2	92	64-136
307-55-1	Perfluorododecanoic acid	10	9.4	94	69-135
72629-94-8	Perfluorotridecanoic acid	10	9.6	96	66-139
376-06-7	Perfluorotetradecanoic acid	10	9.9	99	69-133
375-73-5	Perfluorobutanesulfonic acid	10	9.6	96	72-128
2706-91-4	Perfluoropentanesulfonic acid	10	9.4	94	73-123
355-46-4	Perfluorohexanesulfonic acid	10	9.9	99	67-130
375-92-8	Perfluoroheptanesulfonic acid	10	10.3	103	70-132
1763-23-1	Perfluorooctanesulfonic acid	10	10.1	101	68-136
68259-12-1	Perfluorononanesulfonic acid	10	10.0	100	69-125
335-77-3	Perfluorodecanesulfonic acid	10	10	100	59-134
754-91-6	PFOSA	10	8.7	87	67-137
2355-31-9	MeFOSAA	10	9.6	96	63-144
2991-50-6	EiFOSAA	10	9.7	97	61-139
757124-72-44:2	Fluorotelomer sulfonate	10	9.9	99	62-145
27619-97-2	6:2 Fluorotelomer sulfonate	10	9.9	99	64-140
39108-34-4	8:2 Fluorotelomer sulfonate	10	10.1	101	65-137

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	76%	50-150%
	13C5-PFPeA	77%	50-150%
	13C5-PFHxA	78%	50-150%
	13C4-PFHpA	78%	50-150%
	13C8-PFOA	78%	50-150%
	13C9-PFNA	78%	50-150%
	13C6-PFDA	78%	50-150%
	13C7-PFUnDA	78%	50-150%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FC1128
 Account: TETRHH Tetra Tech
 Project: Red Hill AFFF; HI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP94484-BS	Q98057.D	1	12/16/22	AL	12/12/22	OP94484	SQ2095

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.3 B-15

FC1128-1, FC1128-2, FC1128-3, FC1128-4, FC1128-4A, FC1128-4B

CAS No.	ID Standard Recoveries	BSP	Limits
	13C2-PFDoDA	74%	50-150%
	13C2-PFTeDA	77%	50-150%
	13C3-PFBS	78%	50-150%
	13C3-PFHxS	75%	50-150%
	13C8-PFOS	74%	50-150%
	13C8-FOSA	77%	50-150%
	d3-MeFOSAA	86%	50-150%
	d5-EtFOSAA	81%	50-150%
	13C2-4:2FTS	76%	50-150%
	13C2-6:2FTS	77%	50-150%
	13C2-8:2FTS	76%	50-150%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FC1128
 Account: TETRHH Tetra Tech
 Project: Red Hill AFFF; HI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP94484-MS	Q98060.D	1	12/16/22	AL	12/12/22	OP94484	SQ2095
OP94484-MSD	Q98061.D	1	12/16/22	AL	12/12/22	OP94484	SQ2095
FC1128-1	Q98059.D	1	12/16/22	AL	12/12/22	OP94484	SQ2095

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.3 B-15

FC1128-1, FC1128-2, FC1128-3, FC1128-4, FC1128-4A, FC1128-4B

CAS No.	Compound	FC1128-1 ug/kg	Spike Q ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
375-22-4	Perfluorobutanoic acid	1.3	10	10.9	96	10.2	11.5	100	5	71-135/30
2706-90-3	Perfluoropentanoic acid	4.3	10	14.4	101	10.2	14.9	104	3	69-132/30
307-24-4	Perfluorohexanoic acid	1.9	10	11.6	97	10.2	12.2	101	5	70-132/30
375-85-9	Perfluoroheptanoic acid	1.3	10	11.4	101	10.2	11.8	103	3	71-131/30
335-67-1	Perfluorooctanoic acid	ND	10	10	100	10.2	10.2	100	2	69-133/30
375-95-1	Perfluorononanoic acid	ND	10	9.9	99	10.2	10.0	99	1	72-129/30
335-76-2	Perfluorodecanoic acid	ND	10	10.0	100	10.2	10.4	102	4	69-133/30
2058-94-8	Perfluoroundecanoic acid	ND	10	9.8	98	10.2	10.2	100	4	64-136/30
307-55-1	Perfluorododecanoic acid	ND	10	9.9	99	10.2	10.3	101	4	69-135/30
72629-94-8	Perfluorotridecanoic acid	ND	10	9.9	99	10.2	9.5	94	4	66-139/30
376-06-7	Perfluorotetradecanoic acid	ND	10	10.1	101	10.2	10.5	103	4	69-133/30
375-73-5	Perfluorobutanesulfonic acid	ND	10	9.9	99	10.2	10.4	102	5	72-128/30
2706-91-4	Perfluoropentanesulfonic acid	ND	10	9.7	97	10.2	10.5	103	8	73-123/30
355-46-4	Perfluorohexanesulfonic acid	ND	10	10.3	103	10.2	10.7	105	4	67-130/30
375-92-8	Perfluoroheptanesulfonic acid	ND	10	10.7	107	10.2	11.3	111	5	70-132/30
1763-23-1	Perfluorooctanesulfonic acid	4.2	10	13.7	95	10.2	14.4	100	5	68-136/30
68259-12-1	Perfluorononanesulfonic acid	ND	10	9.6	96	10.2	10.2	100	6	69-125/30
335-77-3	Perfluorodecanesulfonic acid	ND	10	9.3	93	10.2	9.9	98	6	59-134/30
754-91-6	PFOSA	ND	10	9.0	90	10.2	9.5	94	5	67-137/30
2355-31-9	MeFOSAA	ND	10	9.5	95	10.2	10.0	99	5	63-144/30
2991-50-6	EtFOSAA	ND	10	9.7	97	10.2	10.2	100	5	61-139/30
757124-72-44:2	Fluorotelomer sulfonate	ND	10	10.0	100	10.2	10.6	104	6	62-145/30
27619-97-2	6:2 Fluorotelomer sulfonate	2.7	10	12.7	100	10.2	12.7	99	0	64-140/30
39108-34-4	8:2 Fluorotelomer sulfonate	ND	10	10.4	104	10.2	10.7	105	3	65-137/30

CAS No.	ID Standard Recoveries	MS	MSD	FC1128-1	Limits
13C4-PFBA		56%	54%	61%	50-150%
13C5-PFPeA		56%	55%	62%	50-150%
13C5-PFHxA		58%	56%	62%	50-150%
13C4-PFHpA		58%	56%	64%	50-150%
13C8-PFOA		58%	56%	63%	50-150%
13C9-PFNA		58%	57%	65%	50-150%
13C6-PFDA		55%	55%	61%	50-150%
13C7-PFUnDA		52%	51%	58%	50-150%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FC1128
 Account: TETRHH Tetra Tech
 Project: Red Hill AFFF; HI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP94484-MS	Q98060.D	1	12/16/22	AL	12/12/22	OP94484	SQ2095
OP94484-MSD	Q98061.D	1	12/16/22	AL	12/12/22	OP94484	SQ2095
FC1128-1	Q98059.D	1	12/16/22	AL	12/12/22	OP94484	SQ2095

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.3 B-15

FC1128-1, FC1128-2, FC1128-3, FC1128-4, FC1128-4A, FC1128-4B

CAS No.	ID Standard Recoveries	MS	MSD	FC1128-1	Limits
13C2-PFDoDA		45%* a	47%* a	52%	50-150%
13C2-PFTeDA		49%* a	48%* a	54%	50-150%
13C3-PFBS		60%	57%	65%	50-150%
13C3-PFHxS		57%	55%	63%	50-150%
13C8-PFOS		58%	56%	61%	50-150%
13C8-FOSA		51%	52%	58%	50-150%
d3-MeFOSAA		58%	54%	63%	50-150%
d5-EtFOSAA		60%	55%	64%	50-150%
13C2-4:2FTS		57%	54%	58%	50-150%
13C2-6:2FTS		60%	58%	63%	50-150%
13C2-8:2FTS		58%	58%	62%	50-150%

(a) Outside control limits.

* = Outside of Control Limits.