



AGRICULTURE & PRIORITY POLLUTANTS LABORATORIES

A METIRI GROUP COMPANY

908 N. Temperance Ave., Clovis, CA 93611 - Phone 559-275-2175 - www.applinc.com

NELAP Certification Number: CA00046

DoD-ELAP Certification Number 4064.01

State Certification Number:

April 11, 2023

Watson Tanji  
AECOM Honolulu  
1001 Bishop Street, Suite 1600  
Honolulu, HI 96813

RE: Red Hill AFFF Assessment Sampling  
23C0205

Enclosed are the results of analyses for samples received by our laboratory on 3/24/2023. If you have any questions concerning this report, please feel free to contact me.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. These test results meet all requirements of NELAC and DoD QSM. Release of the hard copy has been authorized by the Laboratory Manager or designee, as verified by the following signature.

Sincerely,

Karen Volpendesta  
Project Manager

# Table of Contents

Cover Letter	1
Case Narratives Analyses	3
Sample Results	4
Quality Assurance Results	9
Qualifiers and Definitions	14
Login Summary	15
Chain of Custody	17
Other Documents or Sub Lab Data	19

AECOM Honolulu  
 1001 Bishop Street, Suite 1600  
 Honolulu, HI 96813

Project: Red Hill AFFF Assessment Sampling  
 Project Number: Red Hill AFFF Assessment Sampling / 60697810  
 Project Manager: Watson Tanji

Reported: 04/11/2023 13:10

### Analysis Case Narrative

**EPA 1633:** Manual integrations were performed for this method in accordance with APPL's SOP. Chromatograms after manual integration are enclosed for specific samples and analytes. Abbreviated flags for technical justification are listed on the chromatogram.

Eleven analytes recovered above the upper control limit in the BCC0442-MRL1. Samples were reextracted and this data set was excluded.

The analyte PFOS recovered above the upper control limits in the BCD0035-MRL1. No sample volume remains for re-extraction.

### Samples in this Report

Lab ID	Sample	Matrix	Date Sampled	Date Received
23C0205-01	AF-HDMW225303-WGN01LF-2303W3	Water	03/21/2023 10:00	03/24/2023
23C0205-02	AF-RHMW10-WGN01LF-2303W3	Water	03/21/2023 12:55	03/24/2023

AECOM Honolulu  
1001 Bishop Street, Suite 1600  
Honolulu, HI 96813

Project: Red Hill AFFF Assessment Sampling  
Project Number: Red Hill AFFF Assessment Sampling / 60697810  
Project Manager: Watson Tanji

Reported: 04/11/2023 13:10

## Sample Results

**Sample: AF-HDMW225303-WGN01LF-2303W3**  
**23C0205-01 (Water)**

### Per- and Polyfluoroalkyl Substances

Analyte	Result /Qual	LOQ	LOD	DL	Units	Date Analyzed	DF	Method	Prep Batch
PFBA	0.69 U	1.4	0.69	0.18	ng/L	04/07/23	1	EPA 1633	BCD0035
PFPEA	0.34 U	0.69	0.34	0.056	ng/L	04/07/23	1	EPA 1633	BCD0035
PFHXA	0.17 U	0.34	0.17	0.047	ng/L	04/07/23	1	EPA 1633	BCD0035
PFHPA	0.17 U	0.34	0.17	0.035	ng/L	04/07/23	1	EPA 1633	BCD0035
PFOA	0.26 U	0.34	0.26	0.13	ng/L	04/07/23	1	EPA 1633	BCD0035
PFNA	0.17 U	0.34	0.17	0.071	ng/L	04/07/23	1	EPA 1633	BCD0035
PFDA	0.17 U	0.34	0.17	0.087	ng/L	04/07/23	1	EPA 1633	BCD0035
PFUnA	0.26 U	0.34	0.26	0.14	ng/L	04/07/23	1	EPA 1633	BCD0035
PFDOA	0.17 U	0.34	0.17	0.096	ng/L	04/07/23	1	EPA 1633	BCD0035
PFTRDA	0.26 U	0.34	0.26	0.18	ng/L	04/07/23	1	EPA 1633	BCD0035
PFTEDA	0.26 U	0.34	0.26	0.17	ng/L	04/07/23	1	EPA 1633	BCD0035
PFBS	0.17 U	0.34	0.17	0.032	ng/L	04/07/23	1	EPA 1633	BCD0035
PFPEs	0.17 U	0.34	0.17	0.054	ng/L	04/07/23	1	EPA 1633	BCD0035
PFHXS	0.059 J	0.34	0.17	0.027	ng/L	04/07/23	1	EPA 1633	BCD0035
PFHPS	0.17 U	0.34	0.17	0.044	ng/L	04/07/23	1	EPA 1633	BCD0035
PFOS	0.46	0.34	0.17	0.055	ng/L	04/07/23	1	EPA 1633	BCD0035
PFNS	0.17 U	0.34	0.17	0.11	ng/L	04/07/23	1	EPA 1633	BCD0035
PFDS	0.26 U	0.34	0.26	0.13	ng/L	04/07/23	1	EPA 1633	BCD0035
PFDOS	0.17 U	0.34	0.17	0.11	ng/L	04/07/23	1	EPA 1633	BCD0035
4:2FTS	0.69 U	1.4	0.69	0.25	ng/L	04/07/23	1	EPA 1633	BCD0035
6:2FTS	0.69 U	1.4	0.69	0.27	ng/L	04/07/23	1	EPA 1633	BCD0035
8:2FTS	0.69 U	1.4	0.69	0.071	ng/L	04/07/23	1	EPA 1633	BCD0035
PFOSA	0.17 U	0.34	0.17	0.090	ng/L	04/07/23	1	EPA 1633	BCD0035
NMeFOSA	0.69 U	1.4	0.69	0.41	ng/L	04/07/23	1	EPA 1633	BCD0035
NEtFOSA	0.69 U	1.4	0.69	0.36	ng/L	04/07/23	1	EPA 1633	BCD0035
NMeFOSAA	0.17 U	0.34	0.17	0.091	ng/L	04/07/23	1	EPA 1633	BCD0035
NEtFOSAA	0.17 U	0.34	0.17	0.099	ng/L	04/07/23	1	EPA 1633	BCD0035
NMeFOSE	1.0 U	1.4	1.0	0.87	ng/L	04/07/23	1	EPA 1633	BCD0035
NEtFOSE	1.0 U	1.4	1.0	0.90	ng/L	04/07/23	1	EPA 1633	BCD0035
HFPO-DA	0.34 U	0.69	0.34	0.15	ng/L	04/07/23	1	EPA 1633	BCD0035
ADONA	0.34 U	0.69	0.34	0.11	ng/L	04/07/23	1	EPA 1633	BCD0035
PFEESA	0.34 U	0.69	0.34	0.094	ng/L	04/07/23	1	EPA 1633	BCD0035
PFMPA	0.34 U	0.69	0.34	0.046	ng/L	04/07/23	1	EPA 1633	BCD0035
PFMBA	0.34 U	0.69	0.34	0.078	ng/L	04/07/23	1	EPA 1633	BCD0035
NFDHA	0.34 U	0.69	0.34	0.26	ng/L	04/07/23	1	EPA 1633	BCD0035
9CL-PF3ONS	0.34 U	0.69	0.34	0.18	ng/L	04/07/23	1	EPA 1633	BCD0035
11CL-PF3OUDS	0.34 U	0.69	0.34	0.18	ng/L	04/07/23	1	EPA 1633	BCD0035
3:3FTCA	0.69 U	1.4	0.69	0.50	ng/L	04/07/23	1	EPA 1633	BCD0035
5:3FTCA	0.69 U	1.4	0.69	0.38	ng/L	04/07/23	1	EPA 1633	BCD0035
7:3FTCA	0.69 U	1.4	0.69	0.48	ng/L	04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C4-PFBA	99.8%		10-130			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C5-PFPEA	97.1%		35-150			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C5-PFHXA	101%		55-150			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C4-PFHPA	92.8%		55-150			04/07/23	1	EPA 1633	BCD0035

AECOM Honolulu  
1001 Bishop Street, Suite 1600  
Honolulu, HI 96813

Project: Red Hill AFFF Assessment Sampling  
Project Number: Red Hill AFFF Assessment Sampling / 60697810  
Project Manager: Watson Tanji

Reported: 04/11/2023 13:10

## Sample Results (Continued)

**Sample: AF-HDMW225303-WGN01LF-2303W3 (Continued)**  
**23C0205-01 (Water)**

### Per- and Polyfluoroalkyl Substances (Continued)

Analyte	Result /Qual	LOQ	LOD	DL	Units	Date Analyzed	DF	Method	Prep Batch
Surrogate: 13C8-PFOA	102%		60-140			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C9-PFNA	85.1%		55-140			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C6-PFDA	100%		50-140			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C7-PFUnA	108%		30-140			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C2-PFDOA	99.2%		10-150			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C2-PFTEDA	93.6%		10-130			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C3-PFBS	119%		55-150			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C3-PFHXS	99.7%		55-150			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C8-PFOS	94.2%		45-140			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C2-4:2FTS	128%		60-200			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C2-6:2FTS	109%		60-200			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C2-8:2FTS	93.9%		50-200			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C8-PFOA	90.8%		30-130			04/07/23	1	EPA 1633	BCD0035
Surrogate: D3-NMEFOA	39.3%		15-130			04/07/23	1	EPA 1633	BCD0035
Surrogate: D5-NETFOA	36.5%		10-130			04/07/23	1	EPA 1633	BCD0035
Surrogate: D3-NMEFOSAA	91.7%		45-200			04/07/23	1	EPA 1633	BCD0035
Surrogate: D5-NETFOSAA	93.1%		10-200			04/07/23	1	EPA 1633	BCD0035
Surrogate: D7-NMEFOSE	60.0%		10-150			04/07/23	1	EPA 1633	BCD0035
Surrogate: D9-NETFOSE	68.8%		10-150			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C3-HFPO-DA	101%		25-160			04/07/23	1	EPA 1633	BCD0035

AECOM Honolulu  
1001 Bishop Street, Suite 1600  
Honolulu, HI 96813

Project: Red Hill AFFF Assessment Sampling  
Project Number: Red Hill AFFF Assessment Sampling / 60697810  
Project Manager: Watson Tanji

Reported: 04/11/2023 13:10

## Sample Results (Continued)

**Sample: AF-RHMW10-WGN01LF-2303W3  
23C0205-02 (Water)**

### Per- and Polyfluoroalkyl Substances

Analyte	Result /Qual	LOQ	LOD	DL	Units	Date Analyzed	DF	Method	Prep Batch
PFBA	0.74 U	1.5	0.74	0.19	ng/L	04/07/23	1	EPA 1633	BCD0035
PFPEA	0.37 U	0.74	0.37	0.060	ng/L	04/07/23	1	EPA 1633	BCD0035
PFHXA	0.19 U	0.37	0.19	0.051	ng/L	04/07/23	1	EPA 1633	BCD0035
PFHPA	0.19 U	0.37	0.19	0.038	ng/L	04/07/23	1	EPA 1633	BCD0035
PFOA	0.28 U	0.37	0.28	0.14	ng/L	04/07/23	1	EPA 1633	BCD0035
PFNA	0.19 U	0.37	0.19	0.076	ng/L	04/07/23	1	EPA 1633	BCD0035
PFDA	0.19 U	0.37	0.19	0.094	ng/L	04/07/23	1	EPA 1633	BCD0035
PFUnA	0.28 U	0.37	0.28	0.15	ng/L	04/07/23	1	EPA 1633	BCD0035
PFDOA	0.19 U	0.37	0.19	0.10	ng/L	04/07/23	1	EPA 1633	BCD0035
PFTRDA	0.28 U	0.37	0.28	0.19	ng/L	04/07/23	1	EPA 1633	BCD0035
PFTEDA	0.28 U	0.37	0.28	0.18	ng/L	04/07/23	1	EPA 1633	BCD0035
PFBS	0.19 U	0.37	0.19	0.034	ng/L	04/07/23	1	EPA 1633	BCD0035
PFPEs	0.19 U	0.37	0.19	0.058	ng/L	04/07/23	1	EPA 1633	BCD0035
PFHXS	0.19 U	0.37	0.19	0.029	ng/L	04/07/23	1	EPA 1633	BCD0035
PFHPS	0.19 U	0.37	0.19	0.048	ng/L	04/07/23	1	EPA 1633	BCD0035
PFOS	0.19 U	0.37	0.19	0.059	ng/L	04/07/23	1	EPA 1633	BCD0035
PFNS	0.19 U	0.37	0.19	0.11	ng/L	04/07/23	1	EPA 1633	BCD0035
PFDS	0.28 U	0.37	0.28	0.14	ng/L	04/07/23	1	EPA 1633	BCD0035
PFDOS	0.19 U	0.37	0.19	0.11	ng/L	04/07/23	1	EPA 1633	BCD0035
4:2FTS	0.74 U	1.5	0.74	0.27	ng/L	04/07/23	1	EPA 1633	BCD0035
6:2FTS	0.74 U	1.5	0.74	0.29	ng/L	04/07/23	1	EPA 1633	BCD0035
8:2FTS	0.74 U	1.5	0.74	0.076	ng/L	04/07/23	1	EPA 1633	BCD0035
PFOSA	0.11 J	0.37	0.19	0.097	ng/L	04/07/23	1	EPA 1633	BCD0035
NMeFOSA	0.74 U	1.5	0.74	0.44	ng/L	04/07/23	1	EPA 1633	BCD0035
NEtFOSA	0.74 U	1.5	0.74	0.38	ng/L	04/07/23	1	EPA 1633	BCD0035
NMeFOSAA	0.19 U	0.37	0.19	0.098	ng/L	04/07/23	1	EPA 1633	BCD0035
NEtFOSAA	0.19 U	0.37	0.19	0.11	ng/L	04/07/23	1	EPA 1633	BCD0035
NMeFOSE	1.1 U	1.5	1.1	0.94	ng/L	04/07/23	1	EPA 1633	BCD0035
NEtFOSE	1.1 U	1.5	1.1	0.97	ng/L	04/07/23	1	EPA 1633	BCD0035
HFPO-DA	0.37 U	0.74	0.37	0.16	ng/L	04/07/23	1	EPA 1633	BCD0035
ADONA	0.37 U	0.74	0.37	0.11	ng/L	04/07/23	1	EPA 1633	BCD0035
PFEESA	0.37 U	0.74	0.37	0.10	ng/L	04/07/23	1	EPA 1633	BCD0035
PFMPA	0.37 U	0.74	0.37	0.050	ng/L	04/07/23	1	EPA 1633	BCD0035
PFMBA	0.37 U	0.74	0.37	0.084	ng/L	04/07/23	1	EPA 1633	BCD0035
NFDHA	0.37 U	0.74	0.37	0.28	ng/L	04/07/23	1	EPA 1633	BCD0035
9CL-PF3ONS	0.37 U	0.74	0.37	0.19	ng/L	04/07/23	1	EPA 1633	BCD0035
11CL-PF3OUDS	0.37 U	0.74	0.37	0.19	ng/L	04/07/23	1	EPA 1633	BCD0035
3:3FTCA	0.74 U	1.5	0.74	0.54	ng/L	04/07/23	1	EPA 1633	BCD0035
5:3FTCA	0.74 U	1.5	0.74	0.41	ng/L	04/07/23	1	EPA 1633	BCD0035
7:3FTCA	0.74 U	1.5	0.74	0.52	ng/L	04/07/23	1	EPA 1633	BCD0035
<hr/>									
Surrogate: 13C4-PFBA	101%		10-130			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C5-PFPEA	98.4%		35-150			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C5-PFHXA	93.7%		55-150			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C4-PFHPA	91.1%		55-150			04/07/23	1	EPA 1633	BCD0035

AECOM Honolulu  
1001 Bishop Street, Suite 1600  
Honolulu, HI 96813

Project: Red Hill AFFF Assessment Sampling  
Project Number: Red Hill AFFF Assessment Sampling / 60697810  
Project Manager: Watson Tanji

Reported: 04/11/2023 13:10

## Sample Results (Continued)

**Sample: AF-RHMW10-WGN01LF-2303W3 (Continued)**  
**23C0205-02 (Water)**

### Per- and Polyfluoroalkyl Substances (Continued)

Analyte	Result /Qual	LOQ	LOD	DL	Units	Date Analyzed	DF	Method	Prep Batch
Surrogate: 13C8-PFOA	96.3%		60-140			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C9-PFNA	95.3%		55-140			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C6-PFDA	89.6%		50-140			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C7-PFUnA	94.3%		30-140			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C2-PFDOA	95.7%		10-150			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C2-PFTEDA	90.0%		10-130			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C3-PFBS	113%		55-150			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C3-PFHXS	99.0%		55-150			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C8-PFOS	96.3%		45-140			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C2-4:2FTS	120%		60-200			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C2-6:2FTS	103%		60-200			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C2-8:2FTS	101%		50-200			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C8-PFOA	96.7%		30-130			04/07/23	1	EPA 1633	BCD0035
Surrogate: D3-NMEFOA	58.7%		15-130			04/07/23	1	EPA 1633	BCD0035
Surrogate: D5-NETFOA	59.6%		10-130			04/07/23	1	EPA 1633	BCD0035
Surrogate: D3-NMEFOSAA	93.7%		45-200			04/07/23	1	EPA 1633	BCD0035
Surrogate: D5-NETFOSAA	92.4%		10-200			04/07/23	1	EPA 1633	BCD0035
Surrogate: D7-NMEFOSE	66.6%		10-150			04/07/23	1	EPA 1633	BCD0035
Surrogate: D9-NETFOSE	81.1%		10-150			04/07/23	1	EPA 1633	BCD0035
Surrogate: 13C3-HFPO-DA	99.5%		25-160			04/07/23	1	EPA 1633	BCD0035

AECOM Honolulu  
 1001 Bishop Street, Suite 1600  
 Honolulu, HI 96813

Project: Red Hill AFFF Assessment Sampling  
 Project Number: Red Hill AFFF Assessment Sampling / 60697810  
 Project Manager: Watson Tanji

Reported: 04/11/2023 13:10

## PREPARATION BATCH SUMMARY

EPA 1633

Laboratory: APPL, LLC

Client: AECOM

Batch: BCD0035      Batch Matrix: Water      Preparation: EPA 1633

SAMPLE NAME	LAB SAMPLE ID	DATE PREPARED	INITIAL VOL./WEIGHT mL	FINAL VOL. mL
AF-HDMW225303-WGN01LF-2303W3	23C0205-01RE2	04/04/23 12:20	579.72	2.00
AF-RHMW10-WGN01LF-2303W3	23C0205-02RE2	04/04/23 12:20	537.15	2.00
Blank	BCD0035-BLK1	04/04/23 12:20	500.00	2.00
LCS	BCD0035-BS1	04/04/23 12:20	500.00	2.00
MRL Check	BCD0035-MRL1	04/04/23 12:20	500.00	2.00



AECOM Honolulu 1001 Bishop Street, Suite 1600 Honolulu, HI 96813	Project: Red Hill AFFF Assessment Sampling Project Number: Red Hill AFFF Assessment Sampling / 60697810 Project Manager: Watson Tanji	Reported: 04/11/2023 13:10
--	---	----------------------------

### Quality Control

#### Per- and Polyfluoroalkyl Substances

Analyte	Result/Qual	LOQ	LOD	MDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
---------	-------------	-----	-----	-----	-------------	---------------	------	-------------	-----	-----------

**Method: EPA 1633**

**Batch: BCD0035 - EPA 1633**

	ng/L			
<b>Blank (BCD0035-BLK1)</b>				Prepared: 04/04/23 12:20 Analyzed: 04/07/23 17:34
PFBA	0.80 U	1.6	0.80	0.21
PFPEA	0.40 U	0.80	0.40	0.065
PFHXA	0.20 U	0.40	0.20	0.055
PFHPA	0.20 U	0.40	0.20	0.041
PFOA	0.30 U	0.40	0.30	0.15
PFNA	0.20 U	0.40	0.20	0.082
PFDA	0.20 U	0.40	0.20	0.10
PFUnA	0.30 U	0.40	0.30	0.16
PFDOA	0.20 U	0.40	0.20	0.11
PFTRDA	0.30 U	0.40	0.30	0.20
PFTEDA	0.30 U	0.40	0.30	0.20
PFBS	0.20 U	0.40	0.20	0.037
PFPEs	0.20 U	0.40	0.20	0.063
PFHXS	0.20 U	0.40	0.20	0.032
PFHPS	0.20 U	0.40	0.20	0.051
PFOS	0.20 U	0.40	0.20	0.064
PFNS	0.20 U	0.40	0.20	0.12
PFDS	0.30 U	0.40	0.30	0.15
PFDOS	0.20 U	0.40	0.20	0.12
4:2FTS	0.80 U	1.6	0.80	0.29
6:2FTS	0.80 U	1.6	0.80	0.31
8:2FTS	0.80 U	1.6	0.80	0.082
PFOSA	0.20 U	0.40	0.20	0.10
NMeFOSA	0.80 U	1.6	0.80	0.47
NEtFOSA	0.80 U	1.6	0.80	0.41
NMeFOSAA	0.20 U	0.40	0.20	0.11
NEtFOSAA	0.20 U	0.40	0.20	0.11
NMeFOSE	1.2 U	1.6	1.2	1.0
NEtFOSE	1.2 U	1.6	1.2	1.0
HFPO-DA	0.40 U	0.80	0.40	0.17
ADONA	0.40 U	0.80	0.40	0.12
PFEESA	0.40 U	0.80	0.40	0.11
PFMPA	0.40 U	0.80	0.40	0.054
PFMBA	0.40 U	0.80	0.40	0.091
NFDHA	0.40 U	0.80	0.40	0.30
9CL-PF3ONS	0.40 U	0.80	0.40	0.21
11CL-PF3OUDS	0.40 U	0.80	0.40	0.21
3:3FTCA	0.80 U	1.6	0.80	0.57
5:3FTCA	0.80 U	1.6	0.80	0.44
7:3FTCA	0.80 U	1.6	0.80	0.55

**Surrogates**

13C4-PFBA	34.1	32.0	107	10-130
13C5-PFPEA	20.5	16.0	128	35-150
13C5-PFHXA	9.91	8.00	124	55-150

The contents of this report apply to the sample(s) analyzed in accordance with the chain of custody document.  
 No duplication of this report is allowed, except in its entirety.

AECOM Honolulu  
1001 Bishop Street, Suite 1600  
Honolulu, HI 96813

Project: Red Hill AFFF Assessment Sampling  
Project Number: Red Hill AFFF Assessment Sampling / 60697810  
Project Manager: Watson Tanji

Reported: 04/11/2023 13:10

## Quality Control (Continued)

### Per- and Polyfluoroalkyl Substances (Continued)

Analyte	Result/Qual	LOQ	LOD	MDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
ng/L										
<b>Blank (BCD0035-BLK1)</b>					Prepared: 04/04/23 12:20 Analyzed: 04/07/23 17:34					
<i>Surrogates</i>										
13C4-PFHPA	9.84				8.00		123	55-150		
13C8-PFOA	8.56				8.00		107	60-140		
13C9-PFNA	4.83				4.00		121	55-140		
13C6-PFDA	4.31				4.00		108	50-140		
13C7-PFUnA	4.49				4.00		112	30-140		
13C2-PFDOA	4.06				4.00		102	10-150		
13C2-PFTEDA	4.13				4.00		103	10-130		
13C3-PFBS	8.45				8.00		106	55-150		
13C3-PFHXS	8.37				8.00		105	55-150		
13C8-PFOS	7.83				8.00		97.9	45-140		
13C2-4:2FTS	18.4				16.0		115	60-200		
13C2-6:2FTS	17.9				16.0		112	60-200		
13C2-8:2FTS	17.6				16.0		110	50-200		
13C8-PFOA	7.69				8.00		96.2	30-130		
D3-NMEFOSA	4.55				8.00		56.9	15-130		
D5-NETFOA	4.86				8.00		60.8	10-130		
D3-NMEFOSAA	16.0				16.0		100	45-200		
D5-NETFOSAA	15.3				16.0		95.6	10-200		
D7-NMEFOSE	58.2				80.0		72.8	10-150		
D9-NETFOSE	67.4				80.0		84.2	10-150		
13C3-HFPO-DA	39.4				32.0		123	25-160		
ng/L										
<b>LCS (BCD0035-BS1)</b>					Prepared: 04/04/23 12:20 Analyzed: 04/07/23 17:47					
PFBA	16.7				16.0		104	58-148		
PFPEA	7.86				8.00		98.2	54-152		
PFHXA	4.39				4.00		110	55-152		
PFHPA	4.41				4.00		110	54-154		
PFOA	3.99				4.00		99.9	52-161		
PFNA	4.44				4.00		111	59-149		
PFDA	3.74				4.00		93.4	52-147		
PFUnA	3.83				4.00		95.8	48-159		
PFDOA	4.66				4.00		116	64-142		
PFTRDA	4.40				4.00		110	49-148		
PFTEDA	4.22				4.00		105	47-161		
PFBS	3.65				3.54		103	62-144		
PFPEA	3.88				3.76		103	59-151		
PFHXS	3.55				3.66		97.0	57-146		
PFHPS	3.61				3.82		94.4	55-152		
PFOS	3.54				3.72		95.2	58-149		
PFNS	3.80				3.84		98.9	52-148		
PFDS	3.83				3.86		99.3	51-147		
PFDOS	3.78				3.88		97.5	36-145		
4:2FTS	14.1				15.0		94.2	67-146		
6:2FTS	16.4				15.2		108	61-151		
8:2FTS	17.3				15.4		112	63-152		
PFOSA	4.20				4.00		105	61-148		

AECOM Honolulu  
1001 Bishop Street, Suite 1600  
Honolulu, HI 96813

Project: Red Hill AFFF Assessment Sampling  
Project Number: Red Hill AFFF Assessment Sampling / 60697810  
Project Manager: Watson Tanji

Reported: 04/11/2023 13:10

## Quality Control (Continued)

### Per- and Polyfluoroalkyl Substances (Continued)

Analyte	Result/Qual	LOQ	LOD	MDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
ng/L										
<b>LCS (BCD0035-BS1)</b>								Prepared: 04/04/23 12:20 Analyzed: 04/07/23 17:47		
NMeFOSA	17.7				16.0		111	63-145		
NETFOSA	16.7				16.0		104	65-139		
NMeFOSAA	3.95				4.00		98.9	58-144		
NETFOSAA	4.20				4.00		105	59-146		
NMeFOSE	15.9				16.0		99.4	71-136		
NETFOSE	15.4				16.0		96.2	69-137		
HFPO-DA	8.10				8.00		101	63-144		
ADONA	8.22				7.56		109	68-146		
PFEESA	7.19				7.12		101	56-151		
PFMPA	7.40				8.00		92.5	51-145		
PFMBA	7.36				8.00		92.0	55-148		
NFDHA	8.02				8.00		100	48-161		
9CL-PF3ONS	7.72				7.48		103	56-156		
11CL-PF3OUDS	7.22				7.56		95.6	46-156		
3:3FTCA	13.9				16.0		87.0	62-129		
5:3FTCA	17.0				16.0		106	63-134		
7:3FTCA	14.6				16.0		91.4	50-138		
<b>Surrogates</b>										
13C4-PFBA	33.0				32.0		103	10-130		
13C5-PFPEA	20.1				16.0		126	35-150		
13C5-PFHXA	9.65				8.00		121	55-150		
13C4-PFHFA	9.36				8.00		117	55-150		
13C8-PFOA	8.51				8.00		106	60-140		
13C9-PFNA	4.10				4.00		103	55-140		
13C6-PFDA	4.61				4.00		115	50-140		
13C7-PFUnA	4.98				4.00		125	30-140		
13C2-PFDOA	4.37				4.00		109	10-150		
13C2-PFTEDA	4.37				4.00		109	10-130		
13C3-PFBS	8.39				8.00		105	55-150		
13C3-PFHXS	8.28				8.00		104	55-150		
13C8-PFOS	8.06				8.00		101	45-140		
13C2-4:2FTS	17.4				16.0		109	60-200		
13C2-6:2FTS	17.1				16.0		107	60-200		
13C2-8:2FTS	16.2				16.0		101	50-200		
13C8-PFOSA	7.36				8.00		92.0	30-130		
D3-NMEFOSA	3.79				8.00		47.4	15-130		
D5-NETFOSA	3.92				8.00		49.0	10-130		
D3-NMEFOSAA	15.3				16.0		95.3	45-200		
D5-NETFOSAA	15.1				16.0		94.2	10-200		
D7-NMEFOSE	56.9				80.0		71.1	10-150		
D9-NETFOSE	63.8				80.0		79.7	10-150		
13C3-HFPO-DA	39.1				32.0		122	25-160		

AECOM Honolulu  
 1001 Bishop Street, Suite 1600  
 Honolulu, HI 96813

Project: Red Hill AFFF Assessment Sampling  
 Project Number: Red Hill AFFF Assessment Sampling / 60697810  
 Project Manager: Watson Tanji

Reported: 04/11/2023 13:10

**Quality Control**  
 (Continued)

**Per- and Polyfluoroalkyl Substances (Continued)**

Analyte	Result/Qual	LOQ	LOD	MDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>MRL Check (BCD0035-MRL1)</b>		ng/L		Prepared: 04/04/23 12:20 Analyzed: 04/07/23 18:00						
PFBA	1.61				1.60		100	44-157		
PFPEA	0.770 J				0.800		96.2	57-148		
PFHXA	0.458				0.400		114	62-149		
PFHPA	0.413				0.400		103	56-150		
PFOA	0.416				0.400		104	57-161		
PFNA	0.433				0.400		108	53-157		
PFDA	0.456				0.400		114	43-158		
PFUnA	0.418				0.400		104	50-155		
PFDOA	0.512				0.400		128	60-141		
PFTRDA	0.428				0.400		107	52-140		
PFTEDA	0.368 J				0.400		91.9	52-156		
PFBS	0.425				0.354		120	63-145		
PFPEs	0.352 J				0.376		93.6	58-144		
PFHXS	0.574				0.366		157	44-158		
PFHPS	0.417				0.382		109	51-150		
PFOS	1.20 BS2, MI4				0.372		323	43-162		
PFNS	0.341 J				0.384		88.8	46-151		
PFDS	0.330 J				0.386		85.5	50-144		
PFDOS	0.344 J				0.388		88.7	30-138		
4:2FTS	1.49 J				1.50		99.0	52-158		
6:2FTS	1.49 J				1.52		97.9	48-158		
8:2FTS	1.30 J				1.54		84.5	46-165		
PFOSA	0.455				0.400		114	47-163		
NMeFOSA	1.83				1.60		114	54-155		
NETFOSA	1.64				1.60		103	49-156		
NMeFOSAA	0.423				0.400		106	32-160		
NETFOSAA	0.432				0.400		108	51-154		
NMeFOSE	1.68				1.60		105	56-151		
NETFOSE	1.55 J				1.60		96.8	60-147		
HFPO-DA	0.775 J				0.800		96.8	58-154		
ADONA	0.843				0.756		112	61-148		
PFEESA	0.661 J				0.712		92.8	56-144		
PFMPA	0.742 J				0.800		92.7	48-150		
PFMBA	0.834				0.800		104	49-154		
NFDHA	0.772 J				0.800		96.6	47-160		
9CL-PF3ONS	0.799 J				0.748		107	44-167		
11CL-PF3OUDS	0.732 J				0.756		96.8	36-158		
3:3FTCA	1.50 J				1.60		93.4	32-161		
5:3FTCA	1.32 J IR2,				1.60		82.5	39-156		
7:3FTCA	1.58 J				1.60		98.7	36-149		
<b>Surrogates</b>										
13C4-PFBA	34.4				32.0		108	10-130		
13C5-PFPEA	20.0				16.0		125	35-150		
13C5-PFHXA	9.84				8.00		123	55-150		
13C4-PFHPA	10.1				8.00		126	55-150		
13C8-PFOA	8.45				8.00		106	60-140		
13C9-PFNA	4.15				4.00		104	55-140		

The contents of this report apply to the sample(s) analyzed in accordance with the chain of custody document. No duplication of this report is allowed, except in its entirety.

AECOM Honolulu  
 1001 Bishop Street, Suite 1600  
 Honolulu, HI 96813

Project: Red Hill AFFF Assessment Sampling  
 Project Number: Red Hill AFFF Assessment Sampling / 60697810  
 Project Manager: Watson Tanji

Reported: 04/11/2023 13:10

**Quality Control**  
 (Continued)

**Per- and Polyfluoroalkyl Substances (Continued)**

Analyte	Result/Qual	LOQ	LOD	MDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
ng/L										
<b>MRL Check (BCD0035-MRL1)</b>							Prepared: 04/04/23 12:20	Analyzed: 04/07/23 18:00		
<b>Surrogates</b>										
13C6-PFDA	4.30				4.00		107	50-140		
13C7-PFUnA	4.41				4.00		110	30-140		
13C2-PFDOA	3.79				4.00		94.7	10-150		
13C2-PFTEDA	4.29				4.00		107	10-130		
13C3-PFBS	8.96				8.00		112	55-150		
13C3-PFHXS	9.04				8.00		113	55-150		
13C8-PFOS	8.16				8.00		102	45-140		
13C2-4:2FTS	21.9				16.0		137	60-200		
13C2-6:2FTS	19.2				16.0		120	60-200		
13C2-8:2FTS	17.7				16.0		111	50-200		
13C8-PFOA	7.73				8.00		96.6	30-130		
D3-NMEFOA	4.08				8.00		51.1	15-130		
D5-NETFOA	4.39				8.00		54.8	10-130		
D3-NMEFOA	15.6				16.0		97.3	45-200		
D5-NETFOA	15.7				16.0		97.8	10-200		
D7-NMEFOSE	53.7				80.0		67.1	10-150		
D9-NETFOSE	59.4				80.0		74.3	10-150		
13C3-HFPO-DA	39.1				32.0		122	25-160		

AECOM Honolulu  
 1001 Bishop Street, Suite 1600  
 Honolulu, HI 96813

Project: Red Hill AFFF Assessment Sampling  
 Project Number: Red Hill AFFF Assessment Sampling / 60697810  
 Project Manager: Watson Tanji

Reported: 04/11/2023 13:10

## Notes and Definitions

<b>Item</b>	<b>Definition</b>
BS2	Blank spike recovered above the upper control limit
CV2	Calibration verification recovered above the upper control limit
IR1	Ion ratio below the lower control limit
IR2	Ion ratio above the upper control limit
IS1	Internal standard recovered below the lower control limit
J	Estimated value
MI2	Manual integration, non-target peak interference
MI4	Manual integration, peak unsplit
S2	Surrogate recovered above the upper control limit
U	Not detected
Dry	Sample results reported on a dry weight basis.
DF	Dilution Factor
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
RPD	Relative Percent Difference
%REC	Percent Recovery
Source	Sample that was matrix spiked or duplicated.
LOQ, Limit of Quantitation = Method Reporting Limit (MRL).	

AECOM Honolulu  
1001 Bishop Street, Suite 1600  
Honolulu, HI 96813

Project: Red Hill AFFF Assessment Sampling  
Project Number: Red Hill AFFF Assessment Sampling / 60697810  
Project Manager: Watson Tanji

Reported: 04/11/2023 13:10



AGRICULTURE & PRIORITY POLLUTANTS LABORATORIES

A METIRI GROUP COMPANY

# WORK ORDER

**23C0205**

Printed: 04/11/2023 1:10 pm

**Project:** Red Hill AFFF Assessment Sampling  
**Project Number:** Red Hill AFFF Assessment Sampling / 60697810  
**Project Manager:** Karen Volpendesta  
**PO Number:** 150712

**Report To:**  
AECOM Honolulu  
Watson Tanji  
1001 Bishop Street, Suite 1600  
Honolulu, HI 96813  
Phone: (808) 954-4512  
Fax: (808) 523-8950

**Invoice To:**  
AECOM Honolulu  
Watson Tanji  
1001 Bishop Street, Suite 1600  
Honolulu, HI 96813  
Phone: (808) 954-4512  
Fax: (808) 523-8950

Date Received: 03/24/2023 02:55 PM  
Date Due: 03/31/2023 (5.00 day TAT)

Logged In By: Megan Salata  
Received By: Lincoln Hooper

Analysis	Comments
----------	----------

AECOM Honolulu  
 1001 Bishop Street, Suite 1600  
 Honolulu, HI 96813

Project: Red Hill AFFF Assessment Sampling  
 Project Number: Red Hill AFFF Assessment Sampling / 60697810  
 Project Manager: Watson Tanji

Reported: 04/11/2023 13:10

**23C0205**

**Sample Receipt Log**

Default Cooler

Samples Received at: **0.7°C**

Custody Seals	Yes	Were all containers sealed in separate bags?	Yes
Containers Intact	Yes	Did all containers arrive in good condition?	Yes
COC/Labels Agree	Yes	Correct containers/preserv. for tests indicated?	Yes
Preservation Confirmed	No	Sufficient volume sent for tests requested?	Yes
Received On Ice	Yes	Were bubbles absent in volatile samples?	No
Was a chain of custody received?	Yes	Sufficient remaining holding time for analyses?	Yes
COCs complete/signed in the appropriate places?	Yes	pH of non-VOA preserved containers documented?	No
Sample labels complete? Sample ID, date/time, etc.	Yes	Unpreserved vials received for VOA analysis?	No
Did all container labels agree with COCs?	Yes	If "yes", are unpreserved VOA vials noted on ARF?	No







210)SR

**CUSTODY SEAL**

AECOM (808) 521-3051

Initials GA Date 3/21/23



*[Faint handwritten notes at the bottom left]*

*[Faint mirrored text at the bottom edge, likely bleed-through from the reverse side]*