



AGRICULTURE & PRIORITY POLLUTANTS LABORATORIES

A METIRI GROUP COMPANY

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NELAP Certification Number: CA00046

DoD-ELAP Certification Number 4064.01

State Certification Number:

March 17, 2023

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

RE: Red Hill AFFF Assessment Sampling
23C0092

Enclosed are the results of analyses for samples received by our laboratory on 3/10/2023. 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

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

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

Reported: 03/17/2023 06:17

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.

The extracted internal standards 13C2-4:2FTS and 13C2-8:2FTS recovered above the upper control limit in sample 01 - AF-RHMW03-WGN01LF-2303W1.

The extracted internal standard 13C2-8:2FTS recovered above the upper control limit in sample 02 - AF-RHMW02-WGN01LF-2303W1.

The extracted internal standard 13C2-4:2FTS, recovered above the upper control limit in the BCC0223-BLK1 and the BCC0223-MRL1.

The analytes PFHpA, NEtFOSAA, and 11-CI-PF3OUDS recovered above the upper control limit in the SC01019-LCV1.

The analyte 5:3FTCA recovered below the lower control limit in the SC01019-CCV2.

Samples in this Report

Lab ID	Sample	Matrix	Date Sampled	Date Received
23C0092-01	AF-RHMW03-WGN01LF-2303W1	Water	03/09/2023 12:05	03/10/2023
23C0092-02	AF-RHMW02-WGN01LF-2303W1	Water	03/09/2023 10:15	03/10/2023

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

Reported: 03/17/2023 06:17

Sample Results

Sample: AF-RHMW03-WGN01LF-2303W1
23C0092-01 (Water)

Per- and Polyfluoroalkyl Substances

Analyte	Result /Qual	LOQ	LOD	DL	Units	Date Analyzed	DF	Method	Prep Batch
PFBA	1.6	1.4	0.68	0.18	ng/L	03/14/23	1	EPA 1633	BCC0223
PFPEA	3.5	0.68	0.34	0.056	ng/L	03/14/23	1	EPA 1633	BCC0223
PFHXA	1.8	0.34	0.17	0.047	ng/L	03/14/23	1	EPA 1633	BCC0223
PFHPA	1.4	0.34	0.17	0.035	ng/L	03/14/23	1	EPA 1633	BCC0223
PFOA	0.33 J	0.34	0.17	0.13	ng/L	03/14/23	1	EPA 1633	BCC0223
PFNA	0.17 U	0.34	0.17	0.070	ng/L	03/14/23	1	EPA 1633	BCC0223
PFDA	0.17 U	0.34	0.17	0.087	ng/L	03/14/23	1	EPA 1633	BCC0223
PFUnA	0.26 U	0.34	0.26	0.14	ng/L	03/14/23	1	EPA 1633	BCC0223
PFDOA	0.17 U	0.34	0.17	0.096	ng/L	03/14/23	1	EPA 1633	BCC0223
PFTRDA	0.26 U	0.34	0.26	0.17	ng/L	03/14/23	1	EPA 1633	BCC0223
PFTEDA	0.17 U	0.34	0.17	0.17	ng/L	03/14/23	1	EPA 1633	BCC0223
PFBS	0.17 U	0.34	0.17	0.031	ng/L	03/14/23	1	EPA 1633	BCC0223
PFPEs	0.17 U	0.34	0.17	0.054	ng/L	03/14/23	1	EPA 1633	BCC0223
PFHXS	0.17 U	0.34	0.17	0.027	ng/L	03/14/23	1	EPA 1633	BCC0223
PFHPS	0.17 U	0.34	0.17	0.044	ng/L	03/14/23	1	EPA 1633	BCC0223
PFOS	0.13 J	0.34	0.17	0.054	ng/L	03/14/23	1	EPA 1633	BCC0223
PFNS	0.17 U	0.34	0.17	0.11	ng/L	03/14/23	1	EPA 1633	BCC0223
PFDS	0.17 U	0.34	0.17	0.13	ng/L	03/14/23	1	EPA 1633	BCC0223
PFDOS	0.17 U	0.34	0.17	0.11	ng/L	03/14/23	1	EPA 1633	BCC0223
4:2FTS	0.68 U	1.4	0.68	0.25	ng/L	03/14/23	1	EPA 1633	BCC0223
6:2FTS	9.9	1.4	0.68	0.27	ng/L	03/14/23	1	EPA 1633	BCC0223
8:2FTS	0.68 U	1.4	0.68	0.070	ng/L	03/14/23	1	EPA 1633	BCC0223
PFOSA	0.17 U	0.34	0.17	0.089	ng/L	03/14/23	1	EPA 1633	BCC0223
NMeFOSA	0.68 U	1.4	0.68	0.41	ng/L	03/14/23	1	EPA 1633	BCC0223
NEtFOSA	0.68 U	1.4	0.68	0.35	ng/L	03/14/23	1	EPA 1633	BCC0223
NMeFOSAA	0.17 U	0.34	0.17	0.091	ng/L	03/14/23	1	EPA 1633	BCC0223
NEtFOSAA	0.17 U	0.34	0.17	0.098	ng/L	03/14/23	1	EPA 1633	BCC0223
NMeFOSE	1.0 U	1.4	1.0	0.87	ng/L	03/14/23	1	EPA 1633	BCC0223
NEtFOSE	1.0 U	1.4	1.0	0.90	ng/L	03/14/23	1	EPA 1633	BCC0223
HFPO-DA	0.34 U	0.68	0.34	0.15	ng/L	03/14/23	1	EPA 1633	BCC0223
ADONA	0.34 U	0.68	0.34	0.11	ng/L	03/14/23	1	EPA 1633	BCC0223
PFEESA	0.34 U	0.68	0.34	0.093	ng/L	03/14/23	1	EPA 1633	BCC0223
PFMPA	0.34 U	0.68	0.34	0.046	ng/L	03/14/23	1	EPA 1633	BCC0223
PFMBA	0.34 U	0.68	0.34	0.078	ng/L	03/14/23	1	EPA 1633	BCC0223
NFDHA	0.34 U	0.68	0.34	0.26	ng/L	03/14/23	1	EPA 1633	BCC0223
9CL-PF3ONS	0.34 U	0.68	0.34	0.18	ng/L	03/14/23	1	EPA 1633	BCC0223
11CL-PF3OUDS	0.34 U	0.68	0.34	0.18	ng/L	03/14/23	1	EPA 1633	BCC0223
3:3FTCA	0.68 U	1.4	0.68	0.49	ng/L	03/14/23	1	EPA 1633	BCC0223
5:3FTCA	0.68 U	1.4	0.68	0.38	ng/L	03/14/23	1	EPA 1633	BCC0223
7:3FTCA	0.68 U	1.4	0.68	0.47	ng/L	03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C4-PFBA	85.7%		10-130			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C5-PFPEA	63.5%		35-150			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C5-PFHXA	79.7%		55-150			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C4-PFHPA	72.3%		55-150			03/14/23	1	EPA 1633	BCC0223

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Sample Results (Continued)

Sample: AF-RHMW03-WGN01LF-2303W1 (Continued) 23C0092-01 (Water)

Per- and Polyfluoroalkyl Substances (Continued)

Analyte	Result /Qual	LOQ	LOD	DL	Units	Date Analyzed	DF	Method	Prep Batch
Surrogate: 13C8-PFOA	87.4%		60-140			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C9-PFNA	81.5%		55-140			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C6-PFDA	88.8%		50-140			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C7-PFUnA	92.4%		30-140			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C2-PFDOA	74.0%		10-150			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C2-PFTEDA	61.2%		10-130			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C3-PFBS	107%		55-150			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C3-PFHXS	84.7%		55-150			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C8-PFOS	87.5%		45-140			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C2-4:2FTS	214% S2		60-200			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C2-6:2FTS	161%		60-200			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C2-8:2FTS	218% S2		50-200			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C8-PFOA	51.1%		30-130			03/14/23	1	EPA 1633	BCC0223
Surrogate: D3-NMEFOA	35.0%		15-130			03/14/23	1	EPA 1633	BCC0223
Surrogate: D5-NETFOA	35.2%		10-130			03/14/23	1	EPA 1633	BCC0223
Surrogate: D3-NMEFOSAA	125%		45-200			03/14/23	1	EPA 1633	BCC0223
Surrogate: D5-NETFOSAA	109%		10-200			03/14/23	1	EPA 1633	BCC0223
Surrogate: D7-NMEFOSE	34.3%		10-150			03/14/23	1	EPA 1633	BCC0223
Surrogate: D9-NETFOSE	46.3%		10-150			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C3-HFPO-DA	81.8%		25-160			03/14/23	1	EPA 1633	BCC0223

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Reported: 03/17/2023 06:17

Sample Results
 (Continued)

Sample: AF-RHMW02-WGN01LF-2303W1
23C0092-02 (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	03/14/23	1	EPA 1633	BCC0223
PFPEA	1.0	0.69	0.35	0.056	ng/L	03/14/23	1	EPA 1633	BCC0223
PFHXA	0.35	0.35	0.17	0.047	ng/L	03/14/23	1	EPA 1633	BCC0223
PFHPA	0.27 J	0.35	0.17	0.035	ng/L	03/14/23	1	EPA 1633	BCC0223
PFOA	0.17 U	0.35	0.17	0.13	ng/L	03/14/23	1	EPA 1633	BCC0223
PFNA	0.17 U	0.35	0.17	0.071	ng/L	03/14/23	1	EPA 1633	BCC0223
PFDA	0.17 U	0.35	0.17	0.087	ng/L	03/14/23	1	EPA 1633	BCC0223
PFUnA	0.26 U	0.35	0.26	0.14	ng/L	03/14/23	1	EPA 1633	BCC0223
PFDOA	0.17 U	0.35	0.17	0.097	ng/L	03/14/23	1	EPA 1633	BCC0223
PFTRDA	0.26 U	0.35	0.26	0.18	ng/L	03/14/23	1	EPA 1633	BCC0223
PFTEDA	0.17 U	0.35	0.17	0.17	ng/L	03/14/23	1	EPA 1633	BCC0223
PFBS	0.17 U	0.35	0.17	0.032	ng/L	03/14/23	1	EPA 1633	BCC0223
PFPEs	0.17 U	0.35	0.17	0.054	ng/L	03/14/23	1	EPA 1633	BCC0223
PFHXS	0.17 U	0.35	0.17	0.027	ng/L	03/14/23	1	EPA 1633	BCC0223
PFHPS	0.17 U	0.35	0.17	0.044	ng/L	03/14/23	1	EPA 1633	BCC0223
PFOS	0.17 U	0.35	0.17	0.055	ng/L	03/14/23	1	EPA 1633	BCC0223
PFNS	0.17 U	0.35	0.17	0.11	ng/L	03/14/23	1	EPA 1633	BCC0223
PFDS	0.17 U	0.35	0.17	0.13	ng/L	03/14/23	1	EPA 1633	BCC0223
PFDOS	0.17 U	0.35	0.17	0.11	ng/L	03/14/23	1	EPA 1633	BCC0223
4:2FTS	0.69 U	1.4	0.69	0.25	ng/L	03/14/23	1	EPA 1633	BCC0223
6:2FTS	6.8	1.4	0.69	0.27	ng/L	03/14/23	1	EPA 1633	BCC0223
8:2FTS	0.69 U	1.4	0.69	0.071	ng/L	03/14/23	1	EPA 1633	BCC0223
PFOSA	0.17 U	0.35	0.17	0.090	ng/L	03/14/23	1	EPA 1633	BCC0223
NMeFOSA	0.69 U	1.4	0.69	0.41	ng/L	03/14/23	1	EPA 1633	BCC0223
NEtFOSA	0.69 U	1.4	0.69	0.36	ng/L	03/14/23	1	EPA 1633	BCC0223
NMeFOSAA	0.17 U	0.35	0.17	0.091	ng/L	03/14/23	1	EPA 1633	BCC0223
NEtFOSAA	0.17 U	0.35	0.17	0.099	ng/L	03/14/23	1	EPA 1633	BCC0223
NMeFOSE	1.0 U	1.4	1.0	0.87	ng/L	03/14/23	1	EPA 1633	BCC0223
NEtFOSE	1.0 U	1.4	1.0	0.90	ng/L	03/14/23	1	EPA 1633	BCC0223
HFPO-DA	0.35 U	0.69	0.35	0.15	ng/L	03/14/23	1	EPA 1633	BCC0223
ADONA	0.35 U	0.69	0.35	0.11	ng/L	03/14/23	1	EPA 1633	BCC0223
PFEESA	0.35 U	0.69	0.35	0.094	ng/L	03/14/23	1	EPA 1633	BCC0223
PFMPA	0.35 U	0.69	0.35	0.047	ng/L	03/14/23	1	EPA 1633	BCC0223
PFMBA	0.35 U	0.69	0.35	0.078	ng/L	03/14/23	1	EPA 1633	BCC0223
NFDHA	0.35 U	0.69	0.35	0.26	ng/L	03/14/23	1	EPA 1633	BCC0223
9CL-PF3ONS	0.35 U	0.69	0.35	0.18	ng/L	03/14/23	1	EPA 1633	BCC0223
11CL-PF3OUDS	0.35 U	0.69	0.35	0.18	ng/L	03/14/23	1	EPA 1633	BCC0223
3:3FTCA	0.69 U	1.4	0.69	0.50	ng/L	03/14/23	1	EPA 1633	BCC0223
5:3FTCA	0.69 U	1.4	0.69	0.38	ng/L	03/14/23	1	EPA 1633	BCC0223
7:3FTCA	0.69 U	1.4	0.69	0.48	ng/L	03/14/23	1	EPA 1633	BCC0223
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Surrogate: 13C4-PFBA	83.8%		10-130			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C5-PFPEA	54.3%		35-150			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C5-PFHXA	72.2%		55-150			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C4-PFHPA	67.0%		55-150			03/14/23	1	EPA 1633	BCC0223

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

Reported: 03/17/2023 06:17

Sample Results (Continued)

Sample: AF-RHMW02-WGN01LF-2303W1 (Continued)
23C0092-02 (Water)

Per- and Polyfluoroalkyl Substances (Continued)

Analyte	Result /Qual	LOQ	LOD	DL	Units	Date Analyzed	DF	Method	Prep Batch
Surrogate: 13C8-PFOA	85.3%		60-140			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C9-PFNA	85.8%		55-140			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C6-PFDA	90.1%		50-140			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C7-PFUnA	78.3%		30-140			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C2-PFDOA	71.9%		10-150			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C2-PFTEDA	53.5%		10-130			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C3-PFBS	95.9%		55-150			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C3-PFHXS	82.0%		55-150			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C8-PFOS	78.4%		45-140			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C2-4:2FTS	158%		60-200			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C2-6:2FTS	198%		60-200			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C2-8:2FTS	209% S2		50-200			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C8-PFOA	52.0%		30-130			03/14/23	1	EPA 1633	BCC0223
Surrogate: D3-NMEFOA	31.6%		15-130			03/14/23	1	EPA 1633	BCC0223
Surrogate: D5-NETFOA	34.4%		10-130			03/14/23	1	EPA 1633	BCC0223
Surrogate: D3-NMEFOSAA	115%		45-200			03/14/23	1	EPA 1633	BCC0223
Surrogate: D5-NETFOSAA	94.3%		10-200			03/14/23	1	EPA 1633	BCC0223
Surrogate: D7-NMEFOSE	33.0%		10-150			03/14/23	1	EPA 1633	BCC0223
Surrogate: D9-NETFOSE	39.7%		10-150			03/14/23	1	EPA 1633	BCC0223
Surrogate: 13C3-HFPO-DA	76.3%		25-160			03/14/23	1	EPA 1633	BCC0223

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Project Manager: Watson Tanji

Reported: 03/17/2023 06:17

PREPARATION BATCH SUMMARY

EPA 1633

Laboratory: APPL, LLC

Client: AECOM

Batch: BCC0223 Batch Matrix: Water Preparation: EPA 1633

SAMPLE NAME	LAB SAMPLE ID	DATE PREPARED	INITIAL VOL./WEIGHT mL	FINAL VOL. mL
AF-RHMW03-WGN01LF-2303W1	23C0092-01	03/13/23 12:58	583.96	2.00
AF-RHMW02-WGN01LF-2303W1	23C0092-02	03/13/23 12:58	578.96	2.00
Blank	BCC0223-BLK1	03/13/23 12:58	500.00	2.00
LCS	BCC0223-BS1	03/13/23 12:58	500.00	2.00
MRL Check	BCC0223-MRL1	03/13/23 12:58	500.00	2.00

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Quality Control

Per- and Polyfluoroalkyl Substances

Analyte	Result/Qual	LOQ	LOD	MDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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Method: EPA 1633

Batch: BCC0223 - EPA 1633

	ng/L								
Blank (BCC0223-BLK1)									
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	0.20 U	0.40	0.20	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	0.20 U	0.40	0.20	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	0.20 U	0.40	0.20	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					

Prepared: 03/13/23 12:58 Analyzed: 03/14/23 16:09

Surrogates

13C4-PFBA	27.8	32.0	86.9	10-130
13C5-PFPEA	16.0	16.0	99.9	35-150
13C5-PFHXA	7.61	8.00	95.1	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
Project Manager: Watson Tanji

Reported: 03/17/2023 06:17

Quality Control (Continued)

Per- and Polyfluoroalkyl Substances (Continued)

Analyte	Result/Qual	LOQ	LOD	MDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Blank (BCC0223-BLK1)										
Prepared: 03/13/23 12:58 Analyzed: 03/14/23 16:09										
<i>Surrogates</i>										
13C4-PFHFA	7.66				8.00		95.8	55-150		
13C8-PFOA	6.97				8.00		87.1	60-140		
13C9-PFNA	3.54				4.00		88.5	55-140		
13C6-PFDA	3.25				4.00		81.3	50-140		
13C7-PFUnA	2.92				4.00		72.9	30-140		
13C2-PFDOA	3.24				4.00		81.1	10-150		
13C2-PFTEDA	2.55				4.00		63.7	10-130		
13C3-PFBS	8.03				8.00		100	55-150		
13C3-PFHXS	7.45				8.00		93.1	55-150		
13C8-PFOS	7.31				8.00		91.4	45-140		
13C2-4:2FTS	33.9 S2				16.0		212	60-200		
13C2-6:2FTS	16.0				16.0		99.8	60-200		
13C2-8:2FTS	17.0				16.0		106	50-200		
13C8-PFOA	5.38				8.00		67.3	30-130		
D3-NMEFOA	2.20				8.00		27.5	15-130		
D5-NETFOA	2.44				8.00		30.5	10-130		
D3-NMEFOSAA	13.6				16.0		84.7	45-200		
D5-NETFOSAA	11.9				16.0		74.1	10-200		
D7-NMEFOSE	31.0				80.0		38.8	10-150		
D9-NETFOSE	41.2				80.0		51.6	10-150		
13C3-HFPO-DA	30.7				32.0		96.1	25-160		

LCS (BCC0223-BS1)										
Prepared: 03/13/23 12:58 Analyzed: 03/14/23 16:22										
PFBA	17.8				16.0		111	58-148		
PFPEA	9.03				8.00		113	54-152		
PFHXA	4.49				4.00		112	55-152		
PFHPA	4.59				4.00		115	54-154		
PFOA	4.51				4.00		113	52-161		
PFNA	4.27				4.00		107	59-149		
PFDA	4.49				4.00		112	52-147		
PFUnA	5.21				4.00		130	48-159		
PFDOA	5.21				4.00		130	64-142		
PFTRDA	4.39				4.00		110	49-148		
PFTEDA	4.47				4.00		112	47-161		
PFBS	4.22				3.54		119	62-144		
PFPEA	5.16				3.76		137	59-151		
PFHXS	4.35				3.66		119	57-146		
PFHPS	3.85				3.82		101	55-152		
PFOS	4.10				3.72		110	58-149		
PFNS	4.57				3.84		119	52-148		
PFDS	4.18				3.86		108	51-147		
PFDOS	3.45				3.88		88.8	36-145		
4:2FTS	18.2				15.0		121	67-146		
6:2FTS	18.5				15.2		122	61-151		
8:2FTS	16.5				15.4		107	63-152		
PFOSA	4.77				4.00		119	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
 Project Manager: Watson Tanji

Reported: 03/17/2023 06:17

Quality Control
 (Continued)

Per- and Polyfluoroalkyl Substances (Continued)

Analyte	Result/Qual	LOQ	LOD	MDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
LCS (BCC0223-BS1)		Prepared: 03/13/23 12:58 Analyzed: 03/14/23 16:22								
	ng/L									
NMeFOSA	18.6				16.0		116	63-145		
NETFOSA	18.3				16.0		114	65-139		
NMeFOSAA	3.84				4.00		96.1	58-144		
NETFOSAA	4.46				4.00		111	59-146		
NMeFOSE	18.6				16.0		116	71-136		
NETFOSE	17.0				16.0		106	69-137		
HFPO-DA	10.3				8.00		129	63-144		
ADONA	8.26				7.56		109	68-146		
PFEESA	8.57				7.12		120	56-151		
PFMPA	8.17				8.00		102	51-145		
PFMBA	7.96				8.00		99.5	55-148		
NFDHA	8.75				8.00		109	48-161		
9CL-PF3ONS	9.47				7.48		127	56-156		
11CL-PF3OUDS	8.64				7.56		114	46-156		
3:3FTCA	16.7				16.0		104	62-129		
5:3FTCA	16.5				16.0		103	63-134		
7:3FTCA	14.4				16.0		90.1	50-138		
Surrogates										
13C4-PFBA	27.7				32.0		86.5	10-130		
13C5-PFPEA	16.2				16.0		102	35-150		
13C5-PFHXA	7.49				8.00		93.6	55-150		
13C4-PFHFA	7.50				8.00		93.8	55-150		
13C8-PFOA	7.30				8.00		91.2	60-140		
13C9-PFNA	3.37				4.00		84.3	55-140		
13C6-PFDA	3.53				4.00		88.4	50-140		
13C7-PFUnA	2.98				4.00		74.6	30-140		
13C2-PFDOA	3.14				4.00		78.6	10-150		
13C2-PFTEDA	2.68				4.00		67.1	10-130		
13C3-PFBS	7.36				8.00		92.0	55-150		
13C3-PFHXS	6.86				8.00		85.7	55-150		
13C8-PFOS	6.63				8.00		82.9	45-140		
13C2-4:2FTS	31.3				16.0		196	60-200		
13C2-6:2FTS	14.2				16.0		89.0	60-200		
13C2-8:2FTS	17.7				16.0		111	50-200		
13C8-PFOSA	5.05				8.00		63.1	30-130		
D3-NMEFOSA	2.74				8.00		34.2	15-130		
D5-NETFOSA	2.86				8.00		35.8	10-130		
D3-NMEFOSAA	14.1				16.0		88.3	45-200		
D5-NETFOSAA	12.0				16.0		75.2	10-200		
D7-NMEFOSE	33.7				80.0		42.1	10-150		
D9-NETFOSE	46.3				80.0		57.9	10-150		
13C3-HFPO-DA	31.4				32.0		98.2	25-160		

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

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

Reported: 03/17/2023 06:17

Quality Control
 (Continued)

Per- and Polyfluoroalkyl Substances (Continued)

Analyte	Result/Qual	LOQ	LOD	MDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
MRL Check (BCC0223-MRL1)						Prepared: 03/13/23 12:58		Analyzed: 03/14/23 16:35		
	ng/L									
PFBA	1.88				1.60		117	44-157		
PFPEA	0.940				0.800		117	57-148		
PFHXA	0.562				0.400		141	62-149		
PFHPA	0.504				0.400		126	56-150		
PFOA	0.522				0.400		131	57-161		
PFNA	0.464				0.400		116	53-157		
PFDA	0.443				0.400		111	43-158		
PFUnA	0.414				0.400		104	50-155		
PFDOA	0.488				0.400		122	60-141		
PFTRDA	0.485				0.400		121	52-140		
PFTEDA	0.426				0.400		107	52-156		
PFBS	0.409				0.354		116	63-145		
PFPEs	0.476				0.376		127	58-144		
PFHXS	0.428				0.366		117	44-158		
PFHPS	0.373 J				0.382		97.7	51-150		
PFOS	0.475				0.372		128	43-162		
PFNS	0.408				0.384		106	46-151		
PFDS	0.375 J				0.386		97.1	50-144		
PFDOS	0.369 J				0.388		95.0	30-138		
4:2FTS	1.71				1.50		114	52-158		
6:2FTS	2.25				1.52		148	48-158		
8:2FTS	1.67				1.54		109	46-165		
PFOSA	0.487				0.400		122	47-163		
NMeFOSA	1.77				1.60		111	54-155		
NETFOSA	1.62				1.60		101	49-156		
NMeFOSAA	0.403				0.400		101	32-160		
NETFOSAA	0.495				0.400		124	51-154		
NMeFOSE	1.90				1.60		119	56-151		
NETFOSE	1.61				1.60		101	60-147		
HFPO-DA	1.09				0.800		137	58-154		
ADONA	0.863				0.756		114	61-148		
PFEESA	0.853				0.712		120	56-144		
PFMPA	0.796 J				0.800		99.5	48-150		
PFMBA	0.807				0.800		101	49-154		
NFDHA	0.839				0.800		105	47-160		
9CL-PF3ONS	0.957				0.748		128	44-167		
11CL-PF3OUDS	0.984				0.756		130	36-158		
3:3FTCA	1.50 J				1.60		93.5	32-161		
5:3FTCA	1.56 J				1.60		97.8	39-156		
7:3FTCA	1.48 J				1.60		92.5	36-149		
Surrogates										
13C4-PFBA	27.9				32.0		87.1	10-130		
13C5-PFPEA	14.9				16.0		93.3	35-150		
13C5-PFHXA	6.95				8.00		86.9	55-150		
13C4-PFHPA	7.37				8.00		92.1	55-150		
13C8-PFOA	7.34				8.00		91.8	60-140		
13C9-PFNA	3.24				4.00		81.1	55-140		

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

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

Reported: 03/17/2023 06:17

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										
MRL Check (BCC0223-MRL1)						Prepared: 03/13/23 12:58 Analyzed: 03/14/23 16:35				
Surrogates										
13C6-PFDA	3.62				4.00		90.5	50-140		
13C7-PFUnA	3.21				4.00		80.3	30-140		
13C2-PFDOA	3.14				4.00		78.6	10-150		
13C2-PFTEDA	2.78				4.00		69.6	10-130		
13C3-PFBS	7.71				8.00		96.4	55-150		
13C3-PFHXS	7.01				8.00		87.7	55-150		
13C8-PFOS	6.59				8.00		82.3	45-140		
13C2-4:2FTS	32.9 S2				16.0		205	60-200		
13C2-6:2FTS	14.7				16.0		92.0	60-200		
13C2-8:2FTS	17.0				16.0		106	50-200		
13C8-PFOA	5.07				8.00		63.4	30-130		
D3-NMEFOA	2.25				8.00		28.1	15-130		
D5-NETFOA	2.35				8.00		29.4	10-130		
D3-NMEFOSAA	13.0				16.0		81.2	45-200		
D5-NETFOSAA	11.4				16.0		71.1	10-200		
D7-NMEFOSE	28.5				80.0		35.6	10-150		
D9-NETFOSE	38.6				80.0		48.2	10-150		
13C3-HFPO-DA	28.6				32.0		89.4	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
 Project Manager: Watson Tanji

Reported: 03/17/2023 06:17

Notes and Definitions

Item	Definition
CV1	Calibration verification recovered below the lower 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
J	Estimated value
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
 Project Manager: Watson Tanji

Reported: 03/17/2023 06:17



WORK ORDER

23C0092

Printed: 03/17/2023 6:17 am

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

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: 03/10/2023 02:45 PM
 Date Due: 03/17/2023 (5.00 day TAT)

Logged In By: Megan Salata
 Received By: Megan Salata

Analysis	Comments
23C0092-01 AF-RHMW03-WGN01LF-2303W1 [Water] Sampled 3/9/2023 12:05:00PM 1633 NONE	"Report relevant surrogates"
23C0092-02 AF-RHMW02-WGN01LF-2303W1 [Water] Sampled 3/9/2023 10:15:00AM 1633 NONE	"Report relevant surrogates"

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

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

Reported: 03/17/2023 06:17

23C0092

Sample Receipt Log

Default Cooler

Samples Received at: **0.1°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



APPL, Inc.
 908 N Temperance Ave
 Clovis, CA 93611
 www.applinc.com

ELECTRONIC CHAIN OF CUSTODY RECORD
 Phone: (559) 275-2175
 Fax: (559) 275-4422
 coc@applinc.com C.O.C. 2303W1AFAL02

2300092

Report to: PLEASE PRINT Company Name: AECOM Phone: 808-954-4512 / 303-796-4624 Address: 1001 Bishop St ste1600 Honolulu, HI 96813 Fax: _____ Attn: Watson Tanji / Katie Abbott Email: watson.tanji@aecom.com/katie.abbott@aecom.com	Invoice to: PLEASE PRINT Company Name: AECOM Phone: _____ Address: _____ Fax: _____ Attn: Sheree Smith Email: USAPimaging@aecom.com
--	---

Project Name/Number		Sampler (Print)		Analysis Requested/Method Number		Date Shipped:																																									
CTO N6274223F0104 / 60697810		Andy Young		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th colspan="2">Matrix</th> <th rowspan="2">PFAS EPA Draft 1633</th> <th colspan="10"></th> </tr> <tr> <th>Aq</th> <th>Sed.</th> <th>Soil</th> <th colspan="10"></th> </tr> <tr> <td>✓</td> <td></td> <td></td> <td>✓</td> <td colspan="10" style="text-align:center;"><i>ASYS 3/9/23</i></td> </tr> </table>		Matrix		PFAS EPA Draft 1633											Aq	Sed.	Soil											✓			✓	<i>ASYS 3/9/23</i>										Carrier: <i>United</i>	
Matrix		PFAS EPA Draft 1633																																													
Aq	Sed.		Soil																																												
✓			✓	<i>ASYS 3/9/23</i>																																											
Purchase Order Number		Sampler (Signature)				Waybill No. <i>83560551</i>																																									
		<i>ASYS</i>				Comments: EDMS upload database: JBPHE																																									
Sample Identification	Location	Date Collected	Time Collected	Time Zone	No. of Containers											EDMS Coverage: AFFF Assessment																															
AF-RHMW03-WGN01LF-2303W1	RHMW03	3/9/23	1205	HST	2	<i>ASYS 3/9/23</i>										Sampling GWEDMS Coverage:																															
<i>ASYS 3/9/23</i>																																															

Shuttle Temperature: IRB 3.1/0.1°C		Turnaround Requested: Check one <input type="checkbox"/> Standard 2-3 wk <input type="checkbox"/> One week <input type="checkbox"/> 3 days <input type="checkbox"/> 24/48 Hrs. <input checked="" type="checkbox"/> Other: 5 day TAT				Sample Disposal: <input type="checkbox"/> Return to client <input type="checkbox"/> Disposal by Lab (30-day retention)			
Relinquished by sampler: <i>Andy Young ASYS</i>	Date <i>3/9/23</i>	Time <i>1325</i>	Received by: <i>Ken Young</i>	Relinquished by: <i>Ken Young</i>	Date <i>3/9/23</i>	Time <i>1500</i>	Received by:		
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date <i>3/10/23</i>	Time <i>1445</i>	Received at lab by: <i>[Signature]</i>		

Note: The first sampled date of the ARF will be used as the COC number unless indicated otherwise.



APPL, Inc.
 908 N Temperance Ave
 Clovis, CA 93611
 www.applinc.com

ELECTRONIC CHAIN OF CUSTODY RECORD
 Phone: (559) 275-2175
 Fax: (559) 275-4422
 coc@applinc.com C.O.C. 2303W1AFAL01

Report to: PLEASE PRINT
 Company Name: **AECOM** Phone: 808-954-4512 / 303-796-4624
 Address: **1001 Bishop St ste1600**
Honolulu, HI 96813
 Attn: **Watson Tanji / Katie Abbott**
 Email: **watson.tanji@aecom.com/katie.abbott@aecom.com**

Invoice to: PLEASE PRINT
 Company Name: **AECOM** Phone: _____
 Address: _____ Fax: _____
 Attn: **Sheree Smith**
 Email: **USAPimaging@aecom.com**

Project Name/Number		Sampler (Print)			No. of Containers	Matrix					Analysis Requested/Method Number										Date Shipped:			
Purchase Order Number		Sampler (Signature)				Aq	Sed.	Soil	PFAS EPA Draft 1633													Carrier:	Waybill No.	Comments:
Sample Identification	Location	Date Collected	Time Collected	Time Zone																				
CTO N6274223F0104 / 60697810	Andy Young				2	✓			✓												United	016 83560551	EDMS upload database: JBPHE	
AF-RHMW02-WGN01LF-2303W1	RHMW02	3/9/23	1015	HST																			EDMS Coverage: AFFF Assessment Sampling GW	
 																								

Shuttle Temperature: _____ Turnaround Requested: Check one
 Standard 2-3 wk One week 3 days 24/48 Hrs Other: **5 day TAT**
 Sample Disposal: Return to client Disposal by Lab (30-day retention)

Relinquished by sampler: <i>Andy Young</i>	Date <i>3/9/23</i>	Time <i>1325</i>	Received by: <i>Ken Gam</i>	Relinquished by: <i>Ken Gam</i>	Date <i>3/9/23</i>	Time <i>1500</i>	Received by:
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date <i>3/10/23</i>	Time <i>1445</i>	Received at lab by:

Note: The first sampled date of the ARF will be used as the COC number unless indicated otherwise.

CUSTODY SEAL

AECOM (808)-521-3051

Initials: 1/ Date 3/9/23