



AGRICULTURE & PRIORITY POLLUTANTS LABORATORIES

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NELAP Certification Number: CA00046

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April 17, 2023

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

RE: Red Hill AFFF Assessment Sampling  
23C0239

Enclosed are the results of analyses for samples received by our laboratory on 3/28/2023. 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 / 60697810  
Project Manager: Watson Tanji

Reported: 04/17/2023 12:22

## 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.

Some extracted internal standards recovered outside of control limits in some samples; these samples were diluted and recovered in control, unless stated otherwise.

Samples 01 - AF-RHMW17-WGN01LF-2303W3, 02 - AF-RHMW17D-WGN01LF-2303W3, and 03 - AF-RHMW17D-WQFB01-2303W3 were re-extracted due to failing quality control. Only the re-extraction data has been provided.

The analytes PFHxA, 6:2FTS, and 5:3FTcA recovered above the upper control limit in the SC01502-LCV1.

## Samples in this Report

Lab ID	Sample	Matrix	Date Sampled	Date Received
23C0239-01	AF-RHMW17-WGN01LF-2303W3	Water	03/24/2023 12:35	03/28/2023
23C0239-02	AF-RHMW17D-WGN01LF-2303W3	Water	03/24/2023 11:10	03/28/2023
23C0239-03	AF-RHMW17D-WQFB01-2303W3	Water	03/24/2023 10:00	03/28/2023

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## Sample Results

**Sample: AF-RHMW17-WGN01LF-2303W3**  
**23C0239-01 (Water)**

### Per- and Polyfluoroalkyl Substances

Analyte	Result /Qual	LOQ	LOD	DL	Units	Date Analyzed	DF	Method	Prep Batch
PFBA	4.3	1.4	0.71	0.19	ng/L	04/14/23	1	EPA 1633	BCD0119
PFPEA	9.4	0.71	0.36	0.058	ng/L	04/14/23	1	EPA 1633	BCD0119
PFHXA	4.8	0.36	0.18	0.049	ng/L	04/14/23	1	EPA 1633	BCD0119
PFHPA	1.1	0.36	0.18	0.037	ng/L	04/14/23	1	EPA 1633	BCD0119
PFOA	0.39	0.36	0.27	0.14	ng/L	04/14/23	1	EPA 1633	BCD0119
PFNA	0.12 J IR2,	0.36	0.18	0.073	ng/L	04/14/23	1	EPA 1633	BCD0119
PFDA	0.095 J	0.36	0.18	0.090	ng/L	04/14/23	1	EPA 1633	BCD0119
PFUnA	0.27 U	0.36	0.27	0.14	ng/L	04/14/23	1	EPA 1633	BCD0119
PFDOA	0.18 U	0.36	0.18	0.10	ng/L	04/14/23	1	EPA 1633	BCD0119
PFTRDA	0.27 U	0.36	0.27	0.18	ng/L	04/14/23	1	EPA 1633	BCD0119
PFTEDA	0.27 U	0.36	0.27	0.18	ng/L	04/14/23	1	EPA 1633	BCD0119
PFBS	0.18 J	0.36	0.18	0.033	ng/L	04/14/23	1	EPA 1633	BCD0119
PFPEs	0.18 U	0.36	0.18	0.056	ng/L	04/14/23	1	EPA 1633	BCD0119
PFHXS	0.044 J IR2,	0.36	0.18	0.028	ng/L	04/14/23	1	EPA 1633	BCD0119
PFHPS	0.18 U	0.36	0.18	0.046	ng/L	04/14/23	1	EPA 1633	BCD0119
PFOS	0.12 J	0.36	0.18	0.057	ng/L	04/14/23	1	EPA 1633	BCD0119
PFNS	0.18 U	0.36	0.18	0.11	ng/L	04/14/23	1	EPA 1633	BCD0119
PFDS	0.27 U	0.36	0.27	0.14	ng/L	04/14/23	1	EPA 1633	BCD0119
PFDOS	0.18 U	0.36	0.18	0.11	ng/L	04/14/23	1	EPA 1633	BCD0119
4:2FTS	0.71 U	1.4	0.71	0.26	ng/L	04/14/23	1	EPA 1633	BCD0119
6:2FTS	6.0	1.4	0.71	0.28	ng/L	04/14/23	1	EPA 1633	BCD0119
8:2FTS	0.71 U	1.4	0.71	0.073	ng/L	04/14/23	1	EPA 1633	BCD0119
PFOSA	0.32 J	0.36	0.18	0.093	ng/L	04/14/23	1	EPA 1633	BCD0119
NMeFOSA	0.71 U	1.4	0.71	0.42	ng/L	04/14/23	1	EPA 1633	BCD0119
NEtFOSA	0.71 U	1.4	0.71	0.37	ng/L	04/14/23	1	EPA 1633	BCD0119
NMeFOSAA	0.18 U	0.36	0.18	0.094	ng/L	04/14/23	1	EPA 1633	BCD0119
NEtFOSAA	0.18 U	0.36	0.18	0.10	ng/L	04/14/23	1	EPA 1633	BCD0119
NMeFOSE	1.1 U	1.4	1.1	0.90	ng/L	04/14/23	1	EPA 1633	BCD0119
NEtFOSE	1.1 U	1.4	1.1	0.93	ng/L	04/14/23	1	EPA 1633	BCD0119
HFPO-DA	0.36 U	0.71	0.36	0.16	ng/L	04/14/23	1	EPA 1633	BCD0119
ADONA	0.36 U	0.71	0.36	0.11	ng/L	04/14/23	1	EPA 1633	BCD0119
PFEESA	0.36 U	0.71	0.36	0.097	ng/L	04/14/23	1	EPA 1633	BCD0119
PFMPA	0.36 U	0.71	0.36	0.048	ng/L	04/14/23	1	EPA 1633	BCD0119
PFMBA	0.36 U	0.71	0.36	0.081	ng/L	04/14/23	1	EPA 1633	BCD0119
NFDHA	0.36 U	0.71	0.36	0.27	ng/L	04/14/23	1	EPA 1633	BCD0119
9CL-PF3ONS	0.36 U	0.71	0.36	0.19	ng/L	04/14/23	1	EPA 1633	BCD0119
11CL-PF3OUDS	0.36 U	0.71	0.36	0.18	ng/L	04/14/23	1	EPA 1633	BCD0119
3:3FTCA	0.71 U	1.4	0.71	0.51	ng/L	04/14/23	1	EPA 1633	BCD0119
5:3FTCA	0.71 U	1.4	0.71	0.40	ng/L	04/14/23	1	EPA 1633	BCD0119
7:3FTCA	0.71 U	1.4	0.71	0.49	ng/L	04/14/23	1	EPA 1633	BCD0119
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Surrogate: 13C4-PFBA	80.5%		10-130			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C5-PFPEA	81.6%		35-150			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C5-PFHXA	89.4%		55-150			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C4-PFHPA	97.3%		55-150			04/14/23	1	EPA 1633	BCD0119

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## Sample Results (Continued)

**Sample: AF-RHMW17-WGN01LF-2303W3 (Continued)**  
**23C0239-01 (Water)**

### Per- and Polyfluoroalkyl Substances (Continued)

Analyte	Result /Qual	LOQ	LOD	DL	Units	Date Analyzed	DF	Method	Prep Batch
Surrogate: 13C8-PFOA	90.5%		60-140			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C9-PFNA	91.1%		55-140			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C6-PFDA	89.0%		50-140			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C7-PFUnA	80.1%		30-140			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C2-PFDOA	59.0%		10-150			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C2-PFTEDA	40.0%		10-130			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C3-PFBS	86.9%		55-150			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C3-PFHXS	95.9%		55-150			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C8-PFOS	88.6%		45-140			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C2-4:2FTS	114%		60-200			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C2-6:2FTS	111%		60-200			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C2-8:2FTS	75.8%		50-200			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C8-PFOA	72.4%		30-130			04/14/23	1	EPA 1633	BCD0119
Surrogate: D3-NMEFOA	51.7%		15-130			04/14/23	1	EPA 1633	BCD0119
Surrogate: D5-NETFOA	56.0%		10-130			04/14/23	1	EPA 1633	BCD0119
Surrogate: D3-NMEFOSAA	82.9%		45-200			04/14/23	1	EPA 1633	BCD0119
Surrogate: D5-NETFOSAA	82.6%		10-200			04/14/23	1	EPA 1633	BCD0119
Surrogate: D7-NMEFOSE	36.8%		10-150			04/14/23	1	EPA 1633	BCD0119
Surrogate: D9-NETFOSE	68.0%		10-150			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C3-HFPO-DA	83.8%		25-160			04/14/23	1	EPA 1633	BCD0119

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### Sample Results (Continued)

**Sample: AF-RHMW17D-WGN01LF-2303W3  
23C0239-02 (Water)**

#### Per- and Polyfluoroalkyl Substances

Analyte	Result /Qual	LOQ	LOD	DL	Units	Date Analyzed	DF	Method	Prep Batch
PFBA	0.75 U	1.5	0.75	0.19	ng/L	04/14/23	1	EPA 1633	BCD0119
PFPEA	0.20 J	0.75	0.37	0.061	ng/L	04/14/23	1	EPA 1633	BCD0119
PFHXA	0.19 U	0.37	0.19	0.051	ng/L	04/14/23	1	EPA 1633	BCD0119
PFHPA	0.075 J IR2,	0.37	0.19	0.038	ng/L	04/14/23	1	EPA 1633	BCD0119
PFOA	0.28 U	0.37	0.28	0.14	ng/L	04/14/23	1	EPA 1633	BCD0119
PFNA	0.19 U	0.37	0.19	0.077	ng/L	04/14/23	1	EPA 1633	BCD0119
PFDA	0.19 U IR1,	0.37	0.19	0.095	ng/L	04/14/23	1	EPA 1633	BCD0119
PFUnA	0.28 U	0.37	0.28	0.15	ng/L	04/14/23	1	EPA 1633	BCD0119
PFDOA	0.19 U	0.37	0.19	0.10	ng/L	04/14/23	1	EPA 1633	BCD0119
PFTRDA	0.28 U	0.37	0.28	0.19	ng/L	04/14/23	1	EPA 1633	BCD0119
PFTEDA	0.28 U	0.37	0.28	0.19	ng/L	04/14/23	1	EPA 1633	BCD0119
PFBS	0.078 J	0.37	0.19	0.034	ng/L	04/14/23	1	EPA 1633	BCD0119
PFPEs	0.19 U	0.37	0.19	0.059	ng/L	04/14/23	1	EPA 1633	BCD0119
PFHXS	0.077 J IR2,	0.37	0.19	0.030	ng/L	04/14/23	1	EPA 1633	BCD0119
PFHPS	0.19 U	0.37	0.19	0.048	ng/L	04/14/23	1	EPA 1633	BCD0119
PFOS	0.13 J	0.37	0.19	0.060	ng/L	04/14/23	1	EPA 1633	BCD0119
PFNS	0.19 U	0.37	0.19	0.12	ng/L	04/14/23	1	EPA 1633	BCD0119
PFDS	0.28 U	0.37	0.28	0.14	ng/L	04/14/23	1	EPA 1633	BCD0119
PFDOS	0.19 U	0.37	0.19	0.12	ng/L	04/14/23	1	EPA 1633	BCD0119
4:2FTS	0.75 U	1.5	0.75	0.27	ng/L	04/14/23	1	EPA 1633	BCD0119
6:2FTS	2.8	1.5	0.75	0.29	ng/L	04/14/23	1	EPA 1633	BCD0119
8:2FTS	0.75 U	1.5	0.75	0.077	ng/L	04/14/23	1	EPA 1633	BCD0119
PFOSA	0.19 U	0.37	0.19	0.098	ng/L	04/14/23	1	EPA 1633	BCD0119
NMeFOSA	0.75 U	1.5	0.75	0.44	ng/L	04/14/23	1	EPA 1633	BCD0119
NEtFOSA	0.75 U	1.5	0.75	0.39	ng/L	04/14/23	1	EPA 1633	BCD0119
NMeFOSAA	0.19 U	0.37	0.19	0.099	ng/L	04/14/23	1	EPA 1633	BCD0119
NEtFOSAA	0.19 U	0.37	0.19	0.11	ng/L	04/14/23	1	EPA 1633	BCD0119
NMeFOSE	1.1 U	1.5	1.1	0.95	ng/L	04/14/23	1	EPA 1633	BCD0119
NEtFOSE	1.1 U	1.5	1.1	0.98	ng/L	04/14/23	1	EPA 1633	BCD0119
HFPO-DA	0.37 U	0.75	0.37	0.16	ng/L	04/14/23	1	EPA 1633	BCD0119
ADONA	0.37 U	0.75	0.37	0.12	ng/L	04/14/23	1	EPA 1633	BCD0119
PFEESA	0.37 U	0.75	0.37	0.10	ng/L	04/14/23	1	EPA 1633	BCD0119
PFMPA	0.37 U	0.75	0.37	0.051	ng/L	04/14/23	1	EPA 1633	BCD0119
PFMBA	0.37 U	0.75	0.37	0.085	ng/L	04/14/23	1	EPA 1633	BCD0119
NFDHA	0.37 U	0.75	0.37	0.28	ng/L	04/14/23	1	EPA 1633	BCD0119
9CL-PF3ONS	0.37 U	0.75	0.37	0.20	ng/L	04/14/23	1	EPA 1633	BCD0119
11CL-PF3OUDS	0.37 U	0.75	0.37	0.19	ng/L	04/14/23	1	EPA 1633	BCD0119
3:3FTCA	0.75 U	1.5	0.75	0.54	ng/L	04/14/23	1	EPA 1633	BCD0119
5:3FTCA	0.75 U	1.5	0.75	0.42	ng/L	04/14/23	1	EPA 1633	BCD0119
7:3FTCA	0.75 U	1.5	0.75	0.52	ng/L	04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C4-PFBA	36.0%		10-130			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C5-PFPEA	65.7%		35-150			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C5-PFHXA	80.3%		55-150			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C4-PFHPA	70.8%		55-150			04/14/23	1	EPA 1633	BCD0119

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## Sample Results (Continued)

**Sample: AF-RHMW17D-WGN01LF-2303W3 (Continued)**  
**23C0239-02 (Water)**

### Per- and Polyfluoroalkyl Substances (Continued)

Analyte	Result /Qual	LOQ	LOD	DL	Units	Date Analyzed	DF	Method	Prep Batch
Surrogate: 13C8-PFOA	87.2%		60-140			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C9-PFNA	101%		55-140			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C6-PFDA	90.4%		50-140			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C7-PFUnA	124%		30-140			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C2-PFDOA	120%		10-150			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C2-PFTEDA	90.5%		10-130			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C3-PFBS	96.5%		55-150			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C3-PFHXS	86.4%		55-150			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C8-PFOS	90.8%		45-140			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C2-4:2FTS	206% S2		60-200			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C2-4:2FTS	120%		60-200			04/14/23	10	EPA 1633	BCD0119
Surrogate: 13C2-6:2FTS	199%		60-200			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C2-8:2FTS	155%		50-200			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C8-PFOA	101%		30-130			04/14/23	1	EPA 1633	BCD0119
Surrogate: D3-NMEFOSA	67.9%		15-130			04/14/23	1	EPA 1633	BCD0119
Surrogate: D5-NETFOA	64.1%		10-130			04/14/23	1	EPA 1633	BCD0119
Surrogate: D3-NMEFOSAA	84.1%		45-200			04/14/23	1	EPA 1633	BCD0119
Surrogate: D5-NETFOSAA	126%		10-200			04/14/23	1	EPA 1633	BCD0119
Surrogate: D7-NMEFOSE	39.8%		10-150			04/14/23	1	EPA 1633	BCD0119
Surrogate: D9-NETFOSE	64.9%		10-150			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C3-HFPO-DA	74.8%		25-160			04/14/23	1	EPA 1633	BCD0119

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### Sample Results (Continued)

**Sample: AF-RHMW17D-WQFB01-2303W3  
23C0239-03 (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	04/14/23	1	EPA 1633	BCD0119
PFPEA	0.14 J	0.69	0.34	0.056	ng/L	04/14/23	1	EPA 1633	BCD0119
PFHXA	0.17 U	0.34	0.17	0.047	ng/L	04/14/23	1	EPA 1633	BCD0119
PFHPA	0.13 J	0.34	0.17	0.035	ng/L	04/14/23	1	EPA 1633	BCD0119
PFOA	0.26 U IR1,	0.34	0.26	0.13	ng/L	04/14/23	1	EPA 1633	BCD0119
PFNA	0.17 U	0.34	0.17	0.070	ng/L	04/14/23	1	EPA 1633	BCD0119
PFDA	0.17 U IR2,	0.34	0.17	0.087	ng/L	04/14/23	1	EPA 1633	BCD0119
PFUnA	0.26 U	0.34	0.26	0.14	ng/L	04/14/23	1	EPA 1633	BCD0119
PFDOA	0.17 U	0.34	0.17	0.096	ng/L	04/14/23	1	EPA 1633	BCD0119
PFTRDA	0.26 U	0.34	0.26	0.18	ng/L	04/14/23	1	EPA 1633	BCD0119
PFTEDA	0.26 U	0.34	0.26	0.17	ng/L	04/14/23	1	EPA 1633	BCD0119
PFBS	0.17 U	0.34	0.17	0.032	ng/L	04/14/23	1	EPA 1633	BCD0119
PFPEs	0.17 U	0.34	0.17	0.054	ng/L	04/14/23	1	EPA 1633	BCD0119
PFHXS	0.17 U IR2,	0.34	0.17	0.027	ng/L	04/14/23	1	EPA 1633	BCD0119
PFHPS	0.17 U	0.34	0.17	0.044	ng/L	04/14/23	1	EPA 1633	BCD0119
PFOS	0.088 J IR2,	0.34	0.17	0.055	ng/L	04/14/23	1	EPA 1633	BCD0119
PFNS	0.17 U	0.34	0.17	0.11	ng/L	04/14/23	1	EPA 1633	BCD0119
PFDS	0.26 U	0.34	0.26	0.13	ng/L	04/14/23	1	EPA 1633	BCD0119
PFDOS	0.17 U	0.34	0.17	0.11	ng/L	04/14/23	1	EPA 1633	BCD0119
4:2FTS	0.69 U	1.4	0.69	0.25	ng/L	04/14/23	1	EPA 1633	BCD0119
6:2FTS	0.69 U	1.4	0.69	0.27	ng/L	04/14/23	1	EPA 1633	BCD0119
8:2FTS	0.69 U	1.4	0.69	0.071	ng/L	04/14/23	1	EPA 1633	BCD0119
PFOSA	0.17 U	0.34	0.17	0.090	ng/L	04/14/23	1	EPA 1633	BCD0119
NMeFOSA	0.69 U	1.4	0.69	0.41	ng/L	04/14/23	1	EPA 1633	BCD0119
NEtFOSA	0.69 U	1.4	0.69	0.35	ng/L	04/14/23	1	EPA 1633	BCD0119
NMeFOSAA	0.17 U	0.34	0.17	0.091	ng/L	04/14/23	1	EPA 1633	BCD0119
NEtFOSAA	0.17 U	0.34	0.17	0.099	ng/L	04/14/23	1	EPA 1633	BCD0119
NMeFOSE	1.0 U	1.4	1.0	0.87	ng/L	04/14/23	1	EPA 1633	BCD0119
NEtFOSE	1.0 U	1.4	1.0	0.90	ng/L	04/14/23	1	EPA 1633	BCD0119
HFPO-DA	0.34 U	0.69	0.34	0.15	ng/L	04/14/23	1	EPA 1633	BCD0119
ADONA	0.34 U	0.69	0.34	0.11	ng/L	04/14/23	1	EPA 1633	BCD0119
PFEESA	0.34 U	0.69	0.34	0.094	ng/L	04/14/23	1	EPA 1633	BCD0119
PFMPA	0.34 U	0.69	0.34	0.046	ng/L	04/14/23	1	EPA 1633	BCD0119
PFMBA	0.34 U	0.69	0.34	0.078	ng/L	04/14/23	1	EPA 1633	BCD0119
NFDHA	0.34 U	0.69	0.34	0.26	ng/L	04/14/23	1	EPA 1633	BCD0119
9CL-PF3ONS	0.34 U	0.69	0.34	0.18	ng/L	04/14/23	1	EPA 1633	BCD0119
11CL-PF3OUDS	0.34 U	0.69	0.34	0.18	ng/L	04/14/23	1	EPA 1633	BCD0119
3:3FTCA	0.69 U	1.4	0.69	0.49	ng/L	04/14/23	1	EPA 1633	BCD0119
5:3FTCA	0.69 U	1.4	0.69	0.38	ng/L	04/14/23	1	EPA 1633	BCD0119
7:3FTCA	0.69 U	1.4	0.69	0.48	ng/L	04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C4-PFBA	96.9%		10-130			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C5-PFPEA	89.0%		35-150			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C5-PFHXA	91.0%		55-150			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C4-PFHPA	103%		55-150			04/14/23	1	EPA 1633	BCD0119



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

Reported: 04/17/2023 12:22

## Sample Results (Continued)

**Sample: AF-RHMW17D-WQFB01-2303W3 (Continued)**  
**23C0239-03 (Water)**

### Per- and Polyfluoroalkyl Substances (Continued)

Analyte	Result /Qual	LOQ	LOD	DL	Units	Date Analyzed	DF	Method	Prep Batch
Surrogate: 13C8-PFOA	95.8%		60-140			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C9-PFNA	96.1%		55-140			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C6-PFDA	93.5%		50-140			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C7-PFUnA	91.6%		30-140			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C2-PFDOA	98.7%		10-150			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C2-PFTEDA	86.8%		10-130			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C3-PFBS	89.6%		55-150			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C3-PFHXS	89.7%		55-150			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C8-PFOS	89.1%		45-140			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C2-4:2FTS	92.6%		60-200			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C2-6:2FTS	95.8%		60-200			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C2-8:2FTS	77.4%		50-200			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C8-PFOA	75.8%		30-130			04/14/23	1	EPA 1633	BCD0119
Surrogate: D3-NMEFOA	35.2%		15-130			04/14/23	1	EPA 1633	BCD0119
Surrogate: D5-NETFOA	32.9%		10-130			04/14/23	1	EPA 1633	BCD0119
Surrogate: D3-NMEFOSAA	81.0%		45-200			04/14/23	1	EPA 1633	BCD0119
Surrogate: D5-NETFOSAA	80.7%		10-200			04/14/23	1	EPA 1633	BCD0119
Surrogate: D7-NMEFOSE	53.9%		10-150			04/14/23	1	EPA 1633	BCD0119
Surrogate: D9-NETFOSE	58.1%		10-150			04/14/23	1	EPA 1633	BCD0119
Surrogate: 13C3-HFPO-DA	89.9%		25-160			04/14/23	1	EPA 1633	BCD0119

AECOM Honolulu  
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 Honolulu, HI 96813

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

Reported: 04/17/2023 12:22

## PREPARATION BATCH SUMMARY

EPA 1633

Laboratory: APPL, LLC

Client: AECOM

Batch: BCD0119      Batch Matrix: Water      Preparation: EPA 1633

SAMPLE NAME	LAB SAMPLE ID	DATE PREPARED	INITIAL VOL./WEIGHT mL	FINAL VOL. mL
AF-RHMW17-WGN01LF-2303W3	23C0239-01RE2	04/10/23 08:18	560.73	2.00
AF-RHMW17D-WGN01LF-2303W3	23C0239-02RE2	04/10/23 08:18	533.62	2.00
AF-RHMW17D-WGN01LF-2303W3	23C0239-02RE3	04/10/23 08:18	533.62	2.00
AF-RHMW17D-WQFB01-2303W3	23C0239-03RE2	04/10/23 08:18	581.54	2.00
Blank	BCD0119-BLK1	04/10/23 08:18	500.00	2.00
LCS	BCD0119-BS1	04/10/23 08:18	500.00	2.00
MRL Check	BCD0119-MRL1	04/10/23 08:18	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: 04/17/2023 12:22
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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: BCD0119 - EPA 1633**

	ng/L								
<b>Blank (BCD0119-BLK1)</b>									
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	0.166 J MIZ,	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					

Prepared: 04/10/23 08:18 Analyzed: 04/14/23 15:47

**Surrogates**

13C4-PFBA	28.6	32.0	89.3	10-130
13C5-PFPEA	14.1	16.0	88.4	35-150
13C5-PFHXA	7.08	8.00	88.5	55-150

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**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 (BCD0119-BLK1)										
Prepared: 04/10/23 08:18 Analyzed: 04/14/23 15:47										
<i>Surrogates</i>										
13C4-PFHPA	7.72				8.00		96.5	55-150		
13C8-PFOA	7.13				8.00		89.2	60-140		
13C9-PFNA	3.40				4.00		84.9	55-140		
13C6-PFDA	3.06				4.00		76.6	50-140		
13C7-PFUnA	3.33				4.00		83.1	30-140		
13C2-PFDOA	3.21				4.00		80.2	10-150		
13C2-PFTEDA	2.63				4.00		65.7	10-130		
13C3-PFBS	6.14				8.00		76.8	55-150		
13C3-PFHXS	6.83				8.00		85.4	55-150		
13C8-PFOS	6.55				8.00		81.9	45-140		
13C2-4:2FTS	13.5				16.0		84.6	60-200		
13C2-6:2FTS	13.9				16.0		86.9	60-200		
13C2-8:2FTS	11.4				16.0		71.1	50-200		
13C8-PFOA	5.40				8.00		67.4	30-130		
D3-NMEFOSA	2.09				8.00		26.1	15-130		
D5-NETFOA	1.78				8.00		22.3	10-130		
D3-NMEFOSAA	11.2				16.0		69.8	45-200		
D5-NETFOSAA	10.5				16.0		65.9	10-200		
D7-NMEFOSE	37.1				80.0		46.3	10-150		
D9-NETFOSE	41.3				80.0		51.7	10-150		
13C3-HFPO-DA	25.8				32.0		80.5	25-160		

Analyte	Result/Qual	LOQ	LOD	MDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
LCS (BCD0119-BS1)										
Prepared: 04/10/23 08:18 Analyzed: 04/14/23 16:00										
PFBA	16.2				16.0		101	58-148		
PFPEA	7.80				8.00		97.5	54-152		
PFHXA	4.00				4.00		99.9	55-152		
PFHPA	4.25				4.00		106	54-154		
PFOA	4.07				4.00		102	52-161		
PFNA	4.03				4.00		101	59-149		
PFDA	3.70				4.00		92.6	52-147		
PFUnA	3.66				4.00		91.5	48-159		
PFDOA	4.35				4.00		109	64-142		
PFTRDA	3.99				4.00		99.8	49-148		
PFTEDA	4.44				4.00		111	47-161		
PFBS	3.43				3.54		96.8	62-144		
PFPEA	3.83				3.76		102	59-151		
PFHXS	3.64				3.66		99.5	57-146		
PFHPS	4.01				3.82		105	55-152		
PFOS	3.74				3.72		100	58-149		
PFNS	3.55				3.84		92.5	52-148		
PFDS	3.21				3.86		83.2	51-147		
PFDOS	3.19				3.88		82.1	36-145		
4:2FTS	14.4				15.0		96.1	67-146		
6:2FTS	17.2				15.2		113	61-151		
8:2FTS	14.9				15.4		97.0	63-152		
PFOSA	4.73				4.00		118	61-148		

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.

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

Reported: 04/17/2023 12:22

**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>LCS (BCD0119-BS1)</b>		ng/L		Prepared: 04/10/23 08:18 Analyzed: 04/14/23 16:00						
NMeFOSA	15.6				16.0		97.7	63-145		
NETFOSA	15.4				16.0		96.6	65-139		
NMeFOSAA	3.67				4.00		91.8	58-144		
NETFOSAA	3.58				4.00		89.5	59-146		
NMeFOSE	17.2				16.0		107	71-136		
NETFOSE	15.7				16.0		97.9	69-137		
HFPO-DA	7.95				8.00		99.4	63-144		
ADONA	8.44				7.56		112	68-146		
PFEESA	6.95				7.12		97.6	56-151		
PFMPA	8.79				8.00		110	51-145		
PFMBA	7.79				8.00		97.3	55-148		
NFDHA	7.68				8.00		96.0	48-161		
9CL-PF3ONS	7.99				7.48		107	56-156		
11CL-PF3OUDS	7.13				7.56		94.3	46-156		
3:3FTCA	16.1				16.0		100	62-129		
5:3FTCA	14.8				16.0		92.7	63-134		
7:3FTCA	15.5				16.0		97.0	50-138		
<b>Surrogates</b>										
13C4-PFBA	31.0				32.0		97.0	10-130		
13C5-PFPEA	15.8				16.0		98.8	35-150		
13C5-PFHXA	7.79				8.00		97.4	55-150		
13C4-PFHFA	8.39				8.00		105	55-150		
13C8-PFOA	7.98				8.00		99.8	60-140		
13C9-PFNA	3.88				4.00		97.1	55-140		
13C6-PFDA	3.94				4.00		98.4	50-140		
13C7-PFUnA	4.37				4.00		109	30-140		
13C2-PFDOA	3.91				4.00		97.8	10-150		
13C2-PFTEDA	3.33				4.00		83.2	10-130		
13C3-PFBS	7.22				8.00		90.2	55-150		
13C3-PFHXS	7.61				8.00		95.1	55-150		
13C8-PFOS	7.11				8.00		88.9	45-140		
13C2-4:2FTS	15.1				16.0		94.3	60-200		
13C2-6:2FTS	15.8				16.0		98.5	60-200		
13C2-8:2FTS	14.9				16.0		93.3	50-200		
13C8-PFOSA	5.71				8.00		71.4	30-130		
D3-NMEFOSA	2.94				8.00		36.7	15-130		
D5-NETFOSA	3.10				8.00		38.8	10-130		
D3-NMEFOSAA	12.2				16.0		76.3	45-200		
D5-NETFOSAA	11.6				16.0		72.3	10-200		
D7-NMEFOSE	35.5				80.0		44.3	10-150		
D9-NETFOSSE	63.2				80.0		79.0	10-150		
13C3-HFPO-DA	29.1				32.0		90.8	25-160		

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Reported: 04/17/2023 12:22

## 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 (BCD0119-MRL1)</b>						Prepared: 04/10/23 08:18		Analyzed: 04/14/23 16:12		
	ng/L									
PFBA	1.42 J				1.60		88.7	44-157		
PFPEA	0.746 J				0.800		93.3	57-148		
PFHXA	0.462				0.400		116	62-149		
PFHPA	0.483 IR2				0.400		121	56-150		
PFOA	0.523				0.400		131	57-161		
PFNA	0.440				0.400		110	53-157		
PFDA	0.477 IR1				0.400		119	43-158		
PFUnA	0.306 J				0.400		76.6	50-155		
PFDOA	0.412				0.400		103	60-141		
PFTRDA	0.365 J				0.400		91.3	52-140		
PFTEDA	0.406				0.400		101	52-156		
PFBS	0.309 J				0.354		87.4	63-145		
PFPEs	0.330 J				0.376		87.8	58-144		
PFHXS	0.384 J				0.366		105	44-158		
PFHPS	0.353 J				0.382		92.4	51-150		
PFOS	0.450 M12				0.372		121	43-162		
PFNS	0.340 J				0.384		88.5	46-151		
PFDS	0.324 J				0.386		83.9	50-144		
PFDOS	0.282 J				0.388		72.6	30-138		
4:2FTS	1.36 J				1.50		90.9	52-158		
6:2FTS	2.39				1.52		157	48-158		
8:2FTS	1.41 J				1.54		92.0	46-165		
PFOSA	0.498				0.400		125	47-163		
NMeFOSA	1.53 J				1.60		95.7	54-155		
NETFOSA	1.40 J				1.60		87.7	49-156		
NMeFOSAA	0.322 J				0.400		80.4	32-160		
NETFOSAA	0.348 J				0.400		86.9	51-154		
NMeFOSE	1.42 J				1.60		88.5	56-151		
NETFOSE	1.34 J				1.60		84.0	60-147		
HFPO-DA	0.742 J				0.800		92.8	58-154		
ADONA	0.761 J				0.756		101	61-148		
PFEESA	0.581 J				0.712		81.6	56-144		
PFMPA	0.802				0.800		100	48-150		
PFMBA	0.860				0.800		108	49-154		
NFDHA	0.650 J				0.800		81.2	47-160		
9CL-PF3ONS	0.615 J				0.748		82.2	44-167		
11CL-PF3OUDS	0.703 J				0.756		93.0	36-158		
3:3FTCA	1.39 J				1.60		86.8	32-161		
5:3FTCA	1.63				1.60		102	39-156		
7:3FTCA	1.61				1.60		101	36-149		
<b>Surrogates</b>										
13C4-PFBA	31.7				32.0		99.2	10-130		
13C5-PFPEA	15.8				16.0		98.7	35-150		
13C5-PFHXA	7.90				8.00		98.7	55-150		
13C4-PFHPA	8.14				8.00		102	55-150		
13C8-PFOA	7.52				8.00		94.0	60-140		
13C9-PFNA	3.46				4.00		86.5	55-140		

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

Reported: 04/17/2023 12:22

**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 (BCD0119-MRL1)</b>					Prepared: 04/10/23 08:18 Analyzed: 04/14/23 16:12					
<i>Surrogates</i>										
13C6-PFDA	3.62				4.00		90.4	50-140		
13C7-PFUnA	3.90				4.00		97.5	30-140		
13C2-PFDOA	3.89				4.00		97.3	10-150		
13C2-PFTEDA	3.58				4.00		89.4	10-130		
13C3-PFBS	6.52				8.00		81.5	55-150		
13C3-PFHXS	7.64				8.00		95.5	55-150		
13C8-PFOS	7.08				8.00		88.5	45-140		
13C2-4:2FTS	15.2				16.0		94.9	60-200		
13C2-6:2FTS	15.9				16.0		99.6	60-200		
13C2-8:2FTS	13.3				16.0		83.1	50-200		
13C8-PFOA	5.82				8.00		72.8	30-130		
D3-NMEFOA	2.70				8.00		33.8	15-130		
D5-NETFOA	2.79				8.00		34.9	10-130		
D3-NMEFOSAA	13.0				16.0		81.3	45-200		
D5-NETFOSAA	12.1				16.0		75.4	10-200		
D7-NMEFOSE	51.0				80.0		63.8	10-150		
D9-NETFOSE	59.3				80.0		74.1	10-150		
13C3-HFPO-DA	30.4				32.0		94.9	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: 04/17/2023 12:22

## Notes and Definitions

Item	Definition
CV2	Calibration verification recovered above the upper control limit
E	Response exceeds linear range
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
S1	Surrogate recovered below the lower control limit
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).	



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Reported: 04/17/2023 12:22



## WORK ORDER

**23C0239**

Printed: 04/17/2023 12:22 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: 03/28/2023 11:00 AM  
Date Due: 04/04/2023 (5.00 day TAT)

Logged In By: Megan Salata  
Received By: Megan Salata

**Analysis**

**Comments**

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

Project: Red Hill AFFF Assessment Sampling  
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Reported: 04/17/2023 12:22

**23C0239**

**Sample Receipt Log**

Default Cooler

Samples Received at: **1.2°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





**CUSTODY SEAL**

AECOM (808) 521-3051

Initials

*GH*

Date

*3/27/23*