



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 21, 2023

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

RE: Red Hill AFFF Assessment Sampling  
23C0113

Enclosed are the results of analyses for samples received by our laboratory on 3/14/2023. 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: 03/21/2023 19:11

## 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.

The extracted internal standard 13C2-4:2FTS recovered above the upper control limit in sample 02 - AF-RHMW17D-WGN01LF-2303W1.

The extracted internal standard 13C2-4:2FTS recovered above the upper control limit in the BCC0285-BS1.

The analytes PFPeS, PFHxS, and PFOS recovered above the upper control limit in the BCC0285-MRL1. The extracted internal standard 13C2-4:2FTS recovered above the upper control limit.

The analytes PFHxA, PFDoA, and PFEESA recovered above the upper control limit in the SC01082-LCV1.

The analytes 9CI-PF3ONS and 11CI-PF3OUDS recovered above the upper control limit in the SC01082-CCV2.

The analyte 11-CI- PF3OUDS recovered above the upper control limit in the SC01082-CCV3.

## Samples in this Report

Lab ID	Sample	Matrix	Date Sampled	Date Received
23C0113-01	AF-RHMW17-WGN01LF-2303W1	Water	03/10/2023 13:35	03/14/2023
23C0113-02	AF-RHMW17D-WGN01LF-2303W1	Water	03/10/2023 12:15	03/14/2023
23C0113-03	AF-RHMW17D-WQFB01-2303W1	Water	03/10/2023 11:30	03/14/2023
23C0113-04	AF-RHMW17S-WGN01LF-2303W1	Water	03/10/2023 11:10	03/14/2023
23C0113-05	AF-RHMW17S-WQEB01-2303W1	Water	03/10/2023 14:45	03/14/2023

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## Sample Results

**Sample: AF-RHMW17-WGN01LF-2303W1**  
**23C0113-01 (Water)**

### Per- and Polyfluoroalkyl Substances

Analyte	Result /Qual	LOQ	LOD	DL	Units	Date Analyzed	DF	Method	Prep Batch
PFBA	2.6	1.5	0.76	0.20	ng/L	03/18/23	1	EPA 1633	BCC0285
PFPEA	13	0.76	0.38	0.062	ng/L	03/18/23	1	EPA 1633	BCC0285
PFHXA	5.6	0.38	0.19	0.052	ng/L	03/18/23	1	EPA 1633	BCC0285
PFHPA	0.90	0.38	0.19	0.039	ng/L	03/18/23	1	EPA 1633	BCC0285
PFOA	0.33 J	0.38	0.28	0.14	ng/L	03/18/23	1	EPA 1633	BCC0285
PFNA	0.19 U	0.38	0.19	0.078	ng/L	03/18/23	1	EPA 1633	BCC0285
PFDA	0.19 U	0.38	0.19	0.096	ng/L	03/18/23	1	EPA 1633	BCC0285
PFUnA	0.28 U	0.38	0.28	0.15	ng/L	03/18/23	1	EPA 1633	BCC0285
PFDOA	0.19 U	0.38	0.19	0.11	ng/L	03/18/23	1	EPA 1633	BCC0285
PFTRDA	0.28 U	0.38	0.28	0.19	ng/L	03/18/23	1	EPA 1633	BCC0285
PFTEDA	0.28 U	0.38	0.28	0.19	ng/L	03/18/23	1	EPA 1633	BCC0285
PFBS	0.21 J	0.38	0.19	0.035	ng/L	03/18/23	1	EPA 1633	BCC0285
PFPEs	0.19 U	0.38	0.19	0.060	ng/L	03/18/23	1	EPA 1633	BCC0285
PFHXS	0.44	0.38	0.19	0.030	ng/L	03/18/23	1	EPA 1633	BCC0285
PFHPS	0.19 U	0.38	0.19	0.049	ng/L	03/18/23	1	EPA 1633	BCC0285
PFOS	1.1	0.38	0.19	0.060	ng/L	03/18/23	1	EPA 1633	BCC0285
PFNS	0.19 U	0.38	0.19	0.12	ng/L	03/18/23	1	EPA 1633	BCC0285
PFDS	0.28 U	0.38	0.28	0.14	ng/L	03/18/23	1	EPA 1633	BCC0285
PFDOS	0.19 U	0.38	0.19	0.12	ng/L	03/18/23	1	EPA 1633	BCC0285
4:2FTS	0.76 U	1.5	0.76	0.28	ng/L	03/18/23	1	EPA 1633	BCC0285
6:2FTS	12	1.5	0.76	0.30	ng/L	03/18/23	1	EPA 1633	BCC0285
8:2FTS	0.76 U	1.5	0.76	0.078	ng/L	03/18/23	1	EPA 1633	BCC0285
PFOSA	0.35 J	0.38	0.19	0.099	ng/L	03/18/23	1	EPA 1633	BCC0285
NMeFOSA	0.76 U	1.5	0.76	0.45	ng/L	03/18/23	1	EPA 1633	BCC0285
NEtFOSA	0.76 U	1.5	0.76	0.39	ng/L	03/18/23	1	EPA 1633	BCC0285
NMeFOSAA	0.19 U	0.38	0.19	0.10	ng/L	03/18/23	1	EPA 1633	BCC0285
NEtFOSAA	0.19 U	0.38	0.19	0.11	ng/L	03/18/23	1	EPA 1633	BCC0285
NMeFOSE	1.1 U	1.5	1.1	0.96	ng/L	03/18/23	1	EPA 1633	BCC0285
NEtFOSE	1.1 U	1.5	1.1	0.99	ng/L	03/18/23	1	EPA 1633	BCC0285
HFPO-DA	0.38 U	0.76	0.38	0.17	ng/L	03/18/23	1	EPA 1633	BCC0285
ADONA	0.38 U	0.76	0.38	0.12	ng/L	03/18/23	1	EPA 1633	BCC0285
PFEESA	0.38 U	0.76	0.38	0.10	ng/L	03/18/23	1	EPA 1633	BCC0285
PFMPA	0.38 U	0.76	0.38	0.051	ng/L	03/18/23	1	EPA 1633	BCC0285
PFMBA	0.38 U	0.76	0.38	0.086	ng/L	03/18/23	1	EPA 1633	BCC0285
NFDHA	0.38 U	0.76	0.38	0.29	ng/L	03/18/23	1	EPA 1633	BCC0285
9CL-PF3ONS	0.38 U	0.76	0.38	0.20	ng/L	03/18/23	1	EPA 1633	BCC0285
11CL-PF3OUDS	0.38 U	0.76	0.38	0.20	ng/L	03/18/23	1	EPA 1633	BCC0285
3:3FTCA	0.76 U	1.5	0.76	0.55	ng/L	03/18/23	1	EPA 1633	BCC0285
5:3FTCA	0.76 U	1.5	0.76	0.42	ng/L	03/18/23	1	EPA 1633	BCC0285
7:3FTCA	0.76 U	1.5	0.76	0.53	ng/L	03/18/23	1	EPA 1633	BCC0285
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Surrogate: 13C4-PFBA	87.5%		10-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C5-PFPEA	97.4%		35-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C5-PFHXA	98.3%		55-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C4-PFHPA	114%		55-150			03/18/23	1	EPA 1633	BCC0285

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## Sample Results (Continued)

**Sample: AF-RHMW17-WGN01LF-2303W1 (Continued)**  
**23C0113-01 (Water)**

### Per- and Polyfluoroalkyl Substances (Continued)

Analyte	Result /Qual	LOQ	LOD	DL	Units	Date Analyzed	DF	Method	Prep Batch
Surrogate: 13C8-PFOA	82.1%		60-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C9-PFNA	92.3%		55-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C6-PFDA	83.9%		50-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C7-PFUnA	81.7%		30-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-PFDOA	71.1%		10-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-PFTEDA	55.4%		10-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C3-PFBS	76.1%		55-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C3-PFHXS	92.3%		55-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C8-PFOS	86.1%		45-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-4:2FTS	195%		60-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-6:2FTS	135%		60-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-8:2FTS	187%		50-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C8-PFOA	55.6%		30-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: D3-NMEFOA	30.1%		15-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: D5-NETFOA	30.9%		10-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: D3-NMEFOSAA	134%		45-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: D5-NETFOSAA	122%		10-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: D7-NMEFOSE	36.3%		10-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: D9-NETFOSE	46.8%		10-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C3-HFPO-DA	91.8%		25-160			03/18/23	1	EPA 1633	BCC0285

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### Sample Results (Continued)

**Sample: AF-RHMW17D-WGN01LF-2303W1  
23C0113-02 (Water)**

#### Per- and Polyfluoroalkyl Substances

Analyte	Result /Qual	LOQ	LOD	DL	Units	Date Analyzed	DF	Method	Prep Batch
PFBA	0.78 J	1.6	0.78	0.20	ng/L	03/18/23	1	EPA 1633	BCC0285
PFPEA	0.39 U	0.78	0.39	0.063	ng/L	03/18/23	1	EPA 1633	BCC0285
PFHXA	0.19 U	0.39	0.19	0.053	ng/L	03/18/23	1	EPA 1633	BCC0285
PFHPA	0.093 J	0.39	0.19	0.040	ng/L	03/18/23	1	EPA 1633	BCC0285
PFOA	0.29 U	0.39	0.29	0.15	ng/L	03/18/23	1	EPA 1633	BCC0285
PFNA	0.19 U	0.39	0.19	0.080	ng/L	03/18/23	1	EPA 1633	BCC0285
PFDA	0.19 U	0.39	0.19	0.099	ng/L	03/18/23	1	EPA 1633	BCC0285
PFUnA	0.29 U	0.39	0.29	0.16	ng/L	03/18/23	1	EPA 1633	BCC0285
PFDOA	0.19 U	0.39	0.19	0.11	ng/L	03/18/23	1	EPA 1633	BCC0285
PFTRDA	0.29 U	0.39	0.29	0.20	ng/L	03/18/23	1	EPA 1633	BCC0285
PFTEDA	0.29 U	0.39	0.29	0.19	ng/L	03/18/23	1	EPA 1633	BCC0285
PFBS	0.19 U	0.39	0.19	0.036	ng/L	03/18/23	1	EPA 1633	BCC0285
PFPEs	0.19 U	0.39	0.19	0.061	ng/L	03/18/23	1	EPA 1633	BCC0285
PFHXS	0.25 J	0.39	0.19	0.031	ng/L	03/18/23	1	EPA 1633	BCC0285
PFHPS	0.19 U	0.39	0.19	0.050	ng/L	03/18/23	1	EPA 1633	BCC0285
PFOS	0.34 J	0.39	0.19	0.062	ng/L	03/18/23	1	EPA 1633	BCC0285
PFNS	0.19 U	0.39	0.19	0.12	ng/L	03/18/23	1	EPA 1633	BCC0285
PFDS	0.29 U	0.39	0.29	0.15	ng/L	03/18/23	1	EPA 1633	BCC0285
PFDOS	0.19 U	0.39	0.19	0.12	ng/L	03/18/23	1	EPA 1633	BCC0285
4:2FTS	0.78 U	1.6	0.78	0.28	ng/L	03/18/23	1	EPA 1633	BCC0285
6:2FTS	2.9	1.6	0.78	0.31	ng/L	03/18/23	1	EPA 1633	BCC0285
8:2FTS	0.78 U	1.6	0.78	0.080	ng/L	03/18/23	1	EPA 1633	BCC0285
PFOSA	0.19 U	0.39	0.19	0.10	ng/L	03/18/23	1	EPA 1633	BCC0285
NMeFOSA	0.78 U	1.6	0.78	0.46	ng/L	03/18/23	1	EPA 1633	BCC0285
NEtFOSA	0.78 U	1.6	0.78	0.40	ng/L	03/18/23	1	EPA 1633	BCC0285
NMeFOSAA	0.19 U	0.39	0.19	0.10	ng/L	03/18/23	1	EPA 1633	BCC0285
NEtFOSAA	0.19 U	0.39	0.19	0.11	ng/L	03/18/23	1	EPA 1633	BCC0285
NMeFOSE	1.2 U	1.6	1.2	0.99	ng/L	03/18/23	1	EPA 1633	BCC0285
NEtFOSE	1.2 U	1.6	1.2	1.0	ng/L	03/18/23	1	EPA 1633	BCC0285
HFPO-DA	0.39 U	0.78	0.39	0.17	ng/L	03/18/23	1	EPA 1633	BCC0285
ADONA	0.39 U	0.78	0.39	0.12	ng/L	03/18/23	1	EPA 1633	BCC0285
PFEESA	0.39 U	0.78	0.39	0.11	ng/L	03/18/23	1	EPA 1633	BCC0285
PFMPA	0.49 J	0.78	0.39	0.053	ng/L	03/18/23	1	EPA 1633	BCC0285
PFMBA	0.39 U	0.78	0.39	0.088	ng/L	03/18/23	1	EPA 1633	BCC0285
NFDHA	0.39 U	0.78	0.39	0.29	ng/L	03/18/23	1	EPA 1633	BCC0285
9CL-PF3ONS	0.39 U	0.78	0.39	0.20	ng/L	03/18/23	1	EPA 1633	BCC0285
11CL-PF3OUDS	0.39 U	0.78	0.39	0.20	ng/L	03/18/23	1	EPA 1633	BCC0285
3:3FTCA	0.78 U	1.6	0.78	0.56	ng/L	03/18/23	1	EPA 1633	BCC0285
5:3FTCA	0.78 U	1.6	0.78	0.43	ng/L	03/18/23	1	EPA 1633	BCC0285
7:3FTCA	0.78 U	1.6	0.78	0.54	ng/L	03/18/23	1	EPA 1633	BCC0285
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Surrogate: 13C4-PFBA	85.2%		10-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C5-PFPEA	65.2%		35-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C5-PFHXA	84.5%		55-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C4-PFHPA	86.2%		55-150			03/18/23	1	EPA 1633	BCC0285

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## Sample Results (Continued)

**Sample: AF-RHMW17D-WGN01LF-2303W1 (Continued)**  
**23C0113-02 (Water)**

### Per- and Polyfluoroalkyl Substances (Continued)

Analyte	Result /Qual	LOQ	LOD	DL	Units	Date Analyzed	DF	Method	Prep Batch
Surrogate: 13C8-PFOA	86.3%		60-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C9-PFNA	83.9%		55-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C6-PFDA	90.8%		50-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C7-PFUnA	125%		30-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-PFDOA	115%		10-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-PFTEDA	98.6%		10-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C3-PFBS	88.3%		55-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C3-PFHXS	90.8%		55-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C8-PFOS	82.3%		45-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-4:2FTS	242% S2		60-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-4:2FTS	229% S2		60-200			03/18/23	10	EPA 1633	BCC0285
Surrogate: 13C2-6:2FTS	210% S2		60-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-6:2FTS	105%		60-200			03/18/23	10	EPA 1633	BCC0285
Surrogate: 13C2-8:2FTS	209% S2		50-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-8:2FTS	194%		50-200			03/18/23	10	EPA 1633	BCC0285
Surrogate: 13C8-PFOSA	60.6%		30-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: D3-NMEFOSA	34.4%		15-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: D5-NETFOSA	32.4%		10-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: D3-NMEFOSAA	59.7%		45-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: D5-NETFOSAA	95.6%		10-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: D7-NMEFOSE	33.1%		10-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: D9-NETFOSSE	43.2%		10-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C3-HFPO-DA	89.3%		25-160			03/18/23	1	EPA 1633	BCC0285

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### Sample Results (Continued)

**Sample: AF-RHMW17D-WQFB01-2303W1  
23C0113-03 (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	0.20	ng/L	03/18/23	1	EPA 1633	BCC0285
PFPEA	0.38 U	0.75	0.38	0.061	ng/L	03/18/23	1	EPA 1633	BCC0285
PFHXA	0.19 U	0.38	0.19	0.052	ng/L	03/18/23	1	EPA 1633	BCC0285
PFHPA	0.069 J	0.38	0.19	0.039	ng/L	03/18/23	1	EPA 1633	BCC0285
PFOA	0.28 U	0.38	0.28	0.14	ng/L	03/18/23	1	EPA 1633	BCC0285
PFNA	0.19 U	0.38	0.19	0.077	ng/L	03/18/23	1	EPA 1633	BCC0285
PFDA	0.19 U	0.38	0.19	0.095	ng/L	03/18/23	1	EPA 1633	BCC0285
PFUnA	0.28 U	0.38	0.28	0.15	ng/L	03/18/23	1	EPA 1633	BCC0285
PFDOA	0.19 U	0.38	0.19	0.11	ng/L	03/18/23	1	EPA 1633	BCC0285
PFTRDA	0.28 U	0.38	0.28	0.19	ng/L	03/18/23	1	EPA 1633	BCC0285
PFTEDA	0.28 U	0.38	0.28	0.19	ng/L	03/18/23	1	EPA 1633	BCC0285
PFBS	0.19 U	0.38	0.19	0.035	ng/L	03/18/23	1	EPA 1633	BCC0285
PFPEs	0.19 U	0.38	0.19	0.059	ng/L	03/18/23	1	EPA 1633	BCC0285
PFHXS	0.12 J	0.38	0.19	0.030	ng/L	03/18/23	1	EPA 1633	BCC0285
PFHPS	0.19 U	0.38	0.19	0.048	ng/L	03/18/23	1	EPA 1633	BCC0285
PFOS	0.25 J	0.38	0.19	0.060	ng/L	03/18/23	1	EPA 1633	BCC0285
PFNS	0.19 U	0.38	0.19	0.12	ng/L	03/18/23	1	EPA 1633	BCC0285
PFDS	0.28 U	0.38	0.28	0.14	ng/L	03/18/23	1	EPA 1633	BCC0285
PFDOS	0.19 U	0.38	0.19	0.12	ng/L	03/18/23	1	EPA 1633	BCC0285
4:2FTS	0.75 U	1.5	0.75	0.27	ng/L	03/18/23	1	EPA 1633	BCC0285
6:2FTS	0.75 U IR2,	1.5	0.75	0.30	ng/L	03/18/23	1	EPA 1633	BCC0285
8:2FTS	0.75 U	1.5	0.75	0.077	ng/L	03/18/23	1	EPA 1633	BCC0285
PFOSA	0.19 U	0.38	0.19	0.098	ng/L	03/18/23	1	EPA 1633	BCC0285
NMeFOSA	0.75 U	1.5	0.75	0.44	ng/L	03/18/23	1	EPA 1633	BCC0285
NEtFOSA	0.75 U	1.5	0.75	0.39	ng/L	03/18/23	1	EPA 1633	BCC0285
NMeFOSAA	0.19 U	0.38	0.19	0.099	ng/L	03/18/23	1	EPA 1633	BCC0285
NEtFOSAA	0.19 U	0.38	0.19	0.11	ng/L	03/18/23	1	EPA 1633	BCC0285
NMeFOSE	1.1 U	1.5	1.1	0.95	ng/L	03/18/23	1	EPA 1633	BCC0285
NEtFOSE	1.1 U	1.5	1.1	0.98	ng/L	03/18/23	1	EPA 1633	BCC0285
HFPO-DA	0.38 U	0.75	0.38	0.16	ng/L	03/18/23	1	EPA 1633	BCC0285
ADONA	0.38 U	0.75	0.38	0.12	ng/L	03/18/23	1	EPA 1633	BCC0285
PFEESA	0.38 U	0.75	0.38	0.10	ng/L	03/18/23	1	EPA 1633	BCC0285
PFMPA	0.38 U	0.75	0.38	0.051	ng/L	03/18/23	1	EPA 1633	BCC0285
PFMBA	0.38 U	0.75	0.38	0.085	ng/L	03/18/23	1	EPA 1633	BCC0285
NFDHA	0.38 U	0.75	0.38	0.28	ng/L	03/18/23	1	EPA 1633	BCC0285
9CL-PF3ONS	0.38 U	0.75	0.38	0.20	ng/L	03/18/23	1	EPA 1633	BCC0285
11CL-PF3OUDS	0.38 U	0.75	0.38	0.19	ng/L	03/18/23	1	EPA 1633	BCC0285
3:3FTCA	0.75 U	1.5	0.75	0.54	ng/L	03/18/23	1	EPA 1633	BCC0285
5:3FTCA	0.75 U	1.5	0.75	0.42	ng/L	03/18/23	1	EPA 1633	BCC0285
7:3FTCA	0.75 U	1.5	0.75	0.52	ng/L	03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C4-PFBA	81.3%		10-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C5-PFPEA	88.0%		35-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C5-PFHXA	88.2%		55-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C4-PFHPA	91.3%		55-150			03/18/23	1	EPA 1633	BCC0285



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

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## Sample Results (Continued)

**Sample: AF-RHMW17D-WQFB01-2303W1 (Continued)**  
**23C0113-03 (Water)**

### Per- and Polyfluoroalkyl Substances (Continued)

Analyte	Result /Qual	LOQ	LOD	DL	Units	Date Analyzed	DF	Method	Prep Batch
Surrogate: 13C8-PFOA	85.9%		60-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C9-PFNA	92.7%		55-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C6-PFDA	88.8%		50-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C7-PFUnA	80.6%		30-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-PFDOA	83.8%		10-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-PFTEDA	66.5%		10-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C3-PFBS	87.0%		55-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C3-PFHXS	86.9%		55-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C8-PFOS	81.9%		45-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-4:2FTS	176%		60-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-6:2FTS	104%		60-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-8:2FTS	98.0%		50-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-8:2FTS	114%		50-200			03/18/23	10	EPA 1633	BCC0285
Surrogate: 13C8-PFOA	59.0%		30-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: D3-NMEFOA	25.3%		15-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: D5-NETFOA	26.6%		10-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: D3-NMEFOSAA	87.4%		45-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: D5-NETFOSAA	66.9%		10-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: D7-NMEFOSE	35.3%		10-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: D9-NETFOSE	44.5%		10-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C3-HFPO-DA	88.7%		25-160			03/18/23	1	EPA 1633	BCC0285

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

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## Sample Results (Continued)

**Sample: AF-RHMW17S-WGN01LF-2303W1  
23C0113-04 (Water)**

### Per- and Polyfluoroalkyl Substances

Analyte	Result /Qual	LOQ	LOD	DL	Units	Date Analyzed	DF	Method	Prep Batch
PFBA	3.7	1.5	0.77	0.20	ng/L	03/18/23	1	EPA 1633	BCC0285
PFPEA	1.0	0.77	0.39	0.063	ng/L	03/18/23	1	EPA 1633	BCC0285
PFHXA	1.4	0.39	0.19	0.053	ng/L	03/18/23	1	EPA 1633	BCC0285
PFHPA	0.80	0.39	0.19	0.040	ng/L	03/18/23	1	EPA 1633	BCC0285
PFOA	0.96	0.39	0.29	0.15	ng/L	03/18/23	1	EPA 1633	BCC0285
PFNA	0.28 J IR2,	0.39	0.19	0.079	ng/L	03/18/23	1	EPA 1633	BCC0285
PFDA	0.19 U	0.39	0.19	0.098	ng/L	03/18/23	1	EPA 1633	BCC0285
PFUnA	0.29 U	0.39	0.29	0.15	ng/L	03/18/23	1	EPA 1633	BCC0285
PFDOA	0.19 U	0.39	0.19	0.11	ng/L	03/18/23	1	EPA 1633	BCC0285
PFTRDA	0.29 U	0.39	0.29	0.20	ng/L	03/18/23	1	EPA 1633	BCC0285
PFTEDA	0.29 U	0.39	0.29	0.19	ng/L	03/18/23	1	EPA 1633	BCC0285
PFBS	0.43	0.39	0.19	0.035	ng/L	03/18/23	1	EPA 1633	BCC0285
PFPEs	0.19 U	0.39	0.19	0.060	ng/L	03/18/23	1	EPA 1633	BCC0285
PFHXS	0.40	0.39	0.19	0.031	ng/L	03/18/23	1	EPA 1633	BCC0285
PFHPS	0.19 U	0.39	0.19	0.049	ng/L	03/18/23	1	EPA 1633	BCC0285
PFOS	1.1	0.39	0.19	0.061	ng/L	03/18/23	1	EPA 1633	BCC0285
PFNS	0.19 U	0.39	0.19	0.12	ng/L	03/18/23	1	EPA 1633	BCC0285
PFDS	0.29 U	0.39	0.29	0.15	ng/L	03/18/23	1	EPA 1633	BCC0285
PFDOS	0.19 U	0.39	0.19	0.12	ng/L	03/18/23	1	EPA 1633	BCC0285
4:2FTS	0.77 U	1.5	0.77	0.28	ng/L	03/18/23	1	EPA 1633	BCC0285
6:2FTS	1.6	1.5	0.77	0.30	ng/L	03/18/23	1	EPA 1633	BCC0285
8:2FTS	0.77 U	1.5	0.77	0.079	ng/L	03/18/23	1	EPA 1633	BCC0285
PFOSA	0.12 J	0.39	0.19	0.10	ng/L	03/18/23	1	EPA 1633	BCC0285
NMeFOSA	0.77 U	1.5	0.77	0.46	ng/L	03/18/23	1	EPA 1633	BCC0285
NEtFOSA	0.77 U	1.5	0.77	0.40	ng/L	03/18/23	1	EPA 1633	BCC0285
NMeFOSAA	0.19 U	0.39	0.19	0.10	ng/L	03/18/23	1	EPA 1633	BCC0285
NEtFOSAA	0.19 U	0.39	0.19	0.11	ng/L	03/18/23	1	EPA 1633	BCC0285
NMeFOSE	1.2 U	1.5	1.2	0.98	ng/L	03/18/23	1	EPA 1633	BCC0285
NEtFOSE	1.2 U	1.5	1.2	1.0	ng/L	03/18/23	1	EPA 1633	BCC0285
HFPO-DA	0.39 U	0.77	0.39	0.17	ng/L	03/18/23	1	EPA 1633	BCC0285
ADONA	0.39 U	0.77	0.39	0.12	ng/L	03/18/23	1	EPA 1633	BCC0285
PFEESA	0.39 U	0.77	0.39	0.11	ng/L	03/18/23	1	EPA 1633	BCC0285
PFMPA	0.39 U	0.77	0.39	0.052	ng/L	03/18/23	1	EPA 1633	BCC0285
PFMBA	0.39 U	0.77	0.39	0.088	ng/L	03/18/23	1	EPA 1633	BCC0285
NFDHA	0.39 U	0.77	0.39	0.29	ng/L	03/18/23	1	EPA 1633	BCC0285
9CL-PF3ONS	0.39 U	0.77	0.39	0.20	ng/L	03/18/23	1	EPA 1633	BCC0285
11CL-PF3OUDS	0.39 U	0.77	0.39	0.20	ng/L	03/18/23	1	EPA 1633	BCC0285
3:3FTCA	0.77 U	1.5	0.77	0.55	ng/L	03/18/23	1	EPA 1633	BCC0285
5:3FTCA	0.77 U	1.5	0.77	0.43	ng/L	03/18/23	1	EPA 1633	BCC0285
7:3FTCA	0.77 U	1.5	0.77	0.53	ng/L	03/18/23	1	EPA 1633	BCC0285
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Surrogate: 13C4-PFBA	70.4%		10-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C5-PFPEA	57.5%		35-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C5-PFHXA	77.8%		55-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C4-PFHPA	82.5%		55-150			03/18/23	1	EPA 1633	BCC0285

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## Sample Results (Continued)

**Sample: AF-RHMW17S-WGN01LF-2303W1 (Continued)**  
**23C0113-04 (Water)**

### Per- and Polyfluoroalkyl Substances (Continued)

Analyte	Result /Qual	LOQ	LOD	DL	Units	Date Analyzed	DF	Method	Prep Batch
Surrogate: 13C8-PFOA	83.8%		60-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C9-PFNA	80.9%		55-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C6-PFDA	83.5%		50-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C7-PFUnA	74.5%		30-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-PFDOA	65.2%		10-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-PFTEDA	53.8%		10-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C3-PFBS	74.6%		55-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C3-PFHXS	86.6%		55-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C8-PFOS	84.2%		45-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-4:2FTS	190%		60-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-6:2FTS	163%		60-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-8:2FTS	217% S2		50-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-8:2FTS	103%		50-200			03/18/23	10	EPA 1633	BCC0285
Surrogate: 13C8-PFOA	54.7%		30-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: D3-NMEFOSA	34.0%		15-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: D5-NETFOA	33.1%		10-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: D3-NMEFOSAA	119%		45-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: D5-NETFOSAA	92.9%		10-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: D7-NMEFOSE	36.9%		10-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: D9-NETFOSE	47.6%		10-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C3-HFPO-DA	84.5%		25-160			03/18/23	1	EPA 1633	BCC0285

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Project Manager: Watson Tanji

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### Sample Results (Continued)

**Sample: AF-RHMW17S-WQEB01-2303W1  
23C0113-05 (Water)**

#### Per- and Polyfluoroalkyl Substances

Analyte	Result /Qual	LOQ	LOD	DL	Units	Date Analyzed	DF	Method	Prep Batch
PFBA	0.72 U	1.4	0.72	0.19	ng/L	03/18/23	1	EPA 1633	BCC0285
PFPEA	0.36 U	0.72	0.36	0.058	ng/L	03/18/23	1	EPA 1633	BCC0285
PFHXA	0.18 U	0.36	0.18	0.049	ng/L	03/18/23	1	EPA 1633	BCC0285
PFHPA	0.18 U	0.36	0.18	0.037	ng/L	03/18/23	1	EPA 1633	BCC0285
PFOA	0.27 U	0.36	0.27	0.14	ng/L	03/18/23	1	EPA 1633	BCC0285
PFNA	0.18 U	0.36	0.18	0.073	ng/L	03/18/23	1	EPA 1633	BCC0285
PFDA	0.18 U	0.36	0.18	0.091	ng/L	03/18/23	1	EPA 1633	BCC0285
PFUnA	0.27 U	0.36	0.27	0.14	ng/L	03/18/23	1	EPA 1633	BCC0285
PFDOA	0.18 U	0.36	0.18	0.10	ng/L	03/18/23	1	EPA 1633	BCC0285
PFTRDA	0.27 U	0.36	0.27	0.18	ng/L	03/18/23	1	EPA 1633	BCC0285
PFTEDA	0.27 U	0.36	0.27	0.18	ng/L	03/18/23	1	EPA 1633	BCC0285
PFBS	0.18 U	0.36	0.18	0.033	ng/L	03/18/23	1	EPA 1633	BCC0285
PFPEs	0.18 U	0.36	0.18	0.056	ng/L	03/18/23	1	EPA 1633	BCC0285
PFHXS	0.18 U	0.36	0.18	0.028	ng/L	03/18/23	1	EPA 1633	BCC0285
PFHPS	0.18 U	0.36	0.18	0.046	ng/L	03/18/23	1	EPA 1633	BCC0285
PFOS	0.19 J	0.36	0.18	0.057	ng/L	03/18/23	1	EPA 1633	BCC0285
PFNS	0.18 U	0.36	0.18	0.11	ng/L	03/18/23	1	EPA 1633	BCC0285
PFDS	0.27 U	0.36	0.27	0.14	ng/L	03/18/23	1	EPA 1633	BCC0285
PFDOS	0.18 U	0.36	0.18	0.11	ng/L	03/18/23	1	EPA 1633	BCC0285
4:2FTS	0.72 U	1.4	0.72	0.26	ng/L	03/18/23	1	EPA 1633	BCC0285
6:2FTS	0.72 U	1.4	0.72	0.28	ng/L	03/18/23	1	EPA 1633	BCC0285
8:2FTS	0.72 U	1.4	0.72	0.074	ng/L	03/18/23	1	EPA 1633	BCC0285
PFOSA	0.18 U	0.36	0.18	0.093	ng/L	03/18/23	1	EPA 1633	BCC0285
NMeFOSA	0.72 U	1.4	0.72	0.42	ng/L	03/18/23	1	EPA 1633	BCC0285
NEtFOSA	0.72 U	1.4	0.72	0.37	ng/L	03/18/23	1	EPA 1633	BCC0285
NMeFOSAA	0.18 U	0.36	0.18	0.095	ng/L	03/18/23	1	EPA 1633	BCC0285
NEtFOSAA	0.18 U	0.36	0.18	0.10	ng/L	03/18/23	1	EPA 1633	BCC0285
NMeFOSE	1.1 U	1.4	1.1	0.91	ng/L	03/18/23	1	EPA 1633	BCC0285
NEtFOSE	1.1 U	1.4	1.1	0.94	ng/L	03/18/23	1	EPA 1633	BCC0285
HFPO-DA	0.36 U	0.72	0.36	0.16	ng/L	03/18/23	1	EPA 1633	BCC0285
ADONA	0.36 U	0.72	0.36	0.11	ng/L	03/18/23	1	EPA 1633	BCC0285
PFEESA	0.36 U	0.72	0.36	0.098	ng/L	03/18/23	1	EPA 1633	BCC0285
PFMPA	0.36 U	0.72	0.36	0.048	ng/L	03/18/23	1	EPA 1633	BCC0285
PFMBA	0.36 U	0.72	0.36	0.081	ng/L	03/18/23	1	EPA 1633	BCC0285
NFDHA	0.36 U	0.72	0.36	0.27	ng/L	03/18/23	1	EPA 1633	BCC0285
9CL-PF3ONS	0.36 U	0.72	0.36	0.19	ng/L	03/18/23	1	EPA 1633	BCC0285
11CL-PF3OUDS	0.36 U	0.72	0.36	0.18	ng/L	03/18/23	1	EPA 1633	BCC0285
3:3FTCA	0.72 U	1.4	0.72	0.51	ng/L	03/18/23	1	EPA 1633	BCC0285
5:3FTCA	0.72 U	1.4	0.72	0.40	ng/L	03/18/23	1	EPA 1633	BCC0285
7:3FTCA	0.72 U	1.4	0.72	0.50	ng/L	03/18/23	1	EPA 1633	BCC0285
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Surrogate: 13C4-PFBA	83.2%		10-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C5-PFPEA	91.4%		35-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C5-PFHXA	101%		55-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C4-PFHPA	94.5%		55-150			03/18/23	1	EPA 1633	BCC0285

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## Sample Results (Continued)

**Sample: AF-RHMW17S-WQEB01-2303W1 (Continued)**  
**23C0113-05 (Water)**

### Per- and Polyfluoroalkyl Substances (Continued)

Analyte	Result /Qual	LOQ	LOD	DL	Units	Date Analyzed	DF	Method	Prep Batch
Surrogate: 13C8-PFOA	90.1%		60-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C9-PFNA	93.0%		55-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C6-PFDA	101%		50-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C7-PFUnA	81.1%		30-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-PFDOA	78.1%		10-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-PFTEDA	66.5%		10-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C3-PFBS	90.6%		55-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C3-PFHXS	91.0%		55-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C8-PFOS	85.4%		45-140			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-4:2FTS	198%		60-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-6:2FTS	163%		60-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C2-8:2FTS	191%		50-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C8-PFOA	59.9%		30-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: D3-NMEFOA	29.4%		15-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: D5-NETFOA	28.9%		10-130			03/18/23	1	EPA 1633	BCC0285
Surrogate: D3-NMEFOSAA	112%		45-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: D5-NETFOSAA	68.9%		10-200			03/18/23	1	EPA 1633	BCC0285
Surrogate: D7-NMEFOSE	33.9%		10-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: D9-NETFOSE	40.5%		10-150			03/18/23	1	EPA 1633	BCC0285
Surrogate: 13C3-HFPO-DA	91.5%		25-160			03/18/23	1	EPA 1633	BCC0285

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: 03/21/2023 19:11

## PREPARATION BATCH SUMMARY

EPA 1633

Laboratory: APPL, LLC

Client: AECOM

Batch: BCC0285 Batch Matrix: Water Preparation: EPA 1633

SAMPLE NAME	LAB SAMPLE ID	DATE PREPARED	INITIAL VOL./WEIGHT mL	FINAL VOL. mL
AF-RHMW17-WGN01LF-2303W1	23C0113-01	03/15/23 10:17	526.66	2.00
AF-RHMW17D-WGN01LF-2303W1	23C0113-02	03/15/23 10:17	513.30	2.00
AF-RHMW17D-WGN01LF-2303W1	23C0113-02RE1	03/15/23 10:17	513.30	2.00
AF-RHMW17D-WQFB01-2303W1	23C0113-03	03/15/23 10:17	531.91	2.00
AF-RHMW17D-WQFB01-2303W1	23C0113-03RE1	03/15/23 10:17	531.91	2.00
AF-RHMW17S-WGN01LF-2303W1	23C0113-04	03/15/23 10:17	518.54	2.00
AF-RHMW17S-WGN01LF-2303W1	23C0113-04RE1	03/15/23 10:17	518.54	2.00
AF-RHMW17S-WQEB01-2303W1	23C0113-05	03/15/23 10:17	558.46	2.00
Blank	BCC0285-BLK1	03/15/23 10:17	500.00	2.00
LCS	BCC0285-BS1	03/15/23 10:17	500.00	2.00
MRL Check	BCC0285-MRL1	03/15/23 10:17	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 Project Manager: Watson Tanji	Reported: 03/21/2023 19:11
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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: BCC0285 - EPA 1633**

	ng/L								
<b>Blank (BCC0285-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	0.20 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					

Prepared: 03/15/23 10:17 Analyzed: 03/18/23 02:48

**Surrogates**

13C4-PFBA	27.9			32.0	87.1	10-130
13C5-PFPEA	14.8			16.0	92.3	35-150
13C5-PFHXA	8.19			8.00	102	55-150

AECOM Honolulu  
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Project: Red Hill AFFF Assessment Sampling  
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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
ng/L										
<b>Blank (BCC0285-BLK1)</b>					Prepared: 03/15/23 10:17 Analyzed: 03/18/23 02:48					
<i>Surrogates</i>										
13C4-PFHPA	9.42				8.00		118	55-150		
13C8-PFOA	7.31				8.00		91.3	60-140		
13C9-PFNA	3.56				4.00		89.0	55-140		
13C6-PFDA	3.50				4.00		87.6	50-140		
13C7-PFUnA	3.06				4.00		76.5	30-140		
13C2-PFDOA	3.71				4.00		92.8	10-150		
13C2-PFTEDA	3.05				4.00		76.2	10-130		
13C3-PFBS	6.70				8.00		83.7	55-150		
13C3-PFHXS	6.96				8.00		87.0	55-150		
13C8-PFOS	7.24				8.00		90.5	45-140		
13C2-4:2FTS	31.1				16.0		194	60-200		
13C2-6:2FTS	16.0				16.0		100	60-200		
13C2-8:2FTS	22.1				16.0		138	50-200		
13C8-PFOA	5.58				8.00		69.7	30-130		
D3-NMEFOSA	2.48				8.00		30.9	15-130		
D5-NETFOA	2.53				8.00		31.6	10-130		
D3-NMEFOSAA	15.4				16.0		96.4	45-200		
D5-NETFOSAA	12.1				16.0		75.5	10-200		
D7-NMEFOSE	33.4				80.0		41.8	10-150		
D9-NETFOSE	42.5				80.0		53.1	10-150		
13C3-HFPO-DA	30.2				32.0		94.4	25-160		
ng/L										
<b>LCS (BCC0285-BS1)</b>					Prepared: 03/15/23 10:17 Analyzed: 03/18/23 03:01					
PFBA	17.4				16.0		109	58-148		
PFPEA	8.77				8.00		110	54-152		
PFHXA	4.03				4.00		101	55-152		
PFHPA	4.12				4.00		103	54-154		
PFOA	4.49				4.00		112	52-161		
PFNA	3.97				4.00		99.2	59-149		
PFDA	4.12				4.00		103	52-147		
PFUnA	4.29				4.00		107	48-159		
PFDOA	4.19				4.00		105	64-142		
PFTRDA	4.32				4.00		108	49-148		
PFTEDA	4.10				4.00		102	47-161		
PFBS	3.91				3.54		110	62-144		
PFPEA	4.91				3.76		131	59-151		
PFHXS	3.52				3.66		96.1	57-146		
PFHPS	3.13				3.82		82.1	55-152		
PFOS	3.56				3.72		95.6	58-149		
PFNS	3.91				3.84		102	52-148		
PFDS	3.14				3.86		81.4	51-147		
PFDOS	3.11				3.88		80.2	36-145		
4:2FTS	16.1				15.0		108	67-146		
6:2FTS	16.8				15.2		111	61-151		
8:2FTS	16.5				15.4		108	63-152		
PFOSA	4.60				4.00		115	61-148		



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

Reported: 03/21/2023 19:11

### 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 (BCC0285-BS1)</b>		ng/L								
						Prepared: 03/15/23 10:17	Analyzed: 03/18/23 03:01			
NMeFOSA	16.6				16.0		104	63-145		
NETFOSA	16.3				16.0		102	65-139		
NMeFOSAA	3.26				4.00		81.6	58-144		
NETFOSAA	4.43				4.00		111	59-146		
NMeFOSE	16.5				16.0		103	71-136		
NETFOSE	16.0				16.0		100	69-137		
HFPO-DA	9.17				8.00		115	63-144		
ADONA	8.44				7.56		112	68-146		
PFEESA	8.10				7.12		114	56-151		
PFMPA	8.61				8.00		108	51-145		
PFMBA	7.58				8.00		94.7	55-148		
NFDHA	7.65				8.00		95.6	48-161		
9CL-PF3ONS	9.91				7.48		132	56-156		
11CL-PF3OUDS	9.65				7.56		128	46-156		
3:3FTCA	17.1				16.0		107	62-129		
5:3FTCA	14.0				16.0		87.2	63-134		
7:3FTCA	17.7				16.0		111	50-138		
<b>Surrogates</b>										
13C4-PFBA	27.1				32.0		84.7	10-130		
13C5-PFPEA	18.9				16.0		118	35-150		
13C5-PFHXA	9.90				8.00		124	55-150		
13C4-PFHFA	10.9				8.00		136	55-150		
13C8-PFOA	6.83				8.00		85.4	60-140		
13C9-PFNA	3.76				4.00		94.0	55-140		
13C6-PFDA	3.77				4.00		94.3	50-140		
13C7-PFUnA	3.52				4.00		88.1	30-140		
13C2-PFDOA	3.70				4.00		92.5	10-150		
13C2-PFTEDA	3.13				4.00		78.2	10-130		
13C3-PFBS	6.96				8.00		87.1	55-150		
13C3-PFHXS	7.66				8.00		95.7	55-150		
13C8-PFOS	7.00				8.00		87.5	45-140		
13C2-4:2FTS	34.6 S2				16.0		216	60-200		
13C2-6:2FTS	15.7				16.0		97.9	60-200		
13C2-8:2FTS	19.3				16.0		121	50-200		
13C8-PFOSA	4.90				8.00		61.2	30-130		
D3-NMEFOSA	3.00				8.00		37.4	15-130		
D5-NETFOSA	3.01				8.00		37.6	10-130		
D3-NMEFOSAA	15.7				16.0		98.0	45-200		
D5-NETFOSAA	11.5				16.0		72.0	10-200		
D7-NMEFOSE	32.9				80.0		41.1	10-150		
D9-NETFOSE	41.6				80.0		52.0	10-150		
13C3-HFPO-DA	38.2				32.0		119	25-160		

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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
<b>MRL Check (BCC0285-MRL1)</b>		ng/L		Prepared: 03/15/23 10:17 Analyzed: 03/18/23 03:14						
PFBA	1.69				1.60		106	44-157		
PFPEA	0.866				0.800		108	57-148		
PFHXA	0.522				0.400		131	62-149		
PFHPA	0.444				0.400		111	56-150		
PFOA	0.598				0.400		150	57-161		
PFNA	0.419				0.400		105	53-157		
PFDA	0.392 J IR2,				0.400		97.9	43-158		
PFUnA	0.363 J				0.400		90.8	50-155		
PFDOA	0.352 J				0.400		87.9	60-141		
PFTRDA	0.425				0.400		106	52-140		
PFTEDA	0.441				0.400		110	52-156		
PFBS	0.428				0.354		121	63-145		
PFPEs	0.562 BS2				0.376		150	58-144		
PFHXS	0.991 BS2				0.366		271	44-158		
PFHPS	0.338 J				0.382		88.4	51-150		
PFOS	1.16 BS2				0.372		311	43-162		
PFNS	0.364 J				0.384		94.8	46-151		
PFDS	0.329 J				0.386		85.1	50-144		
PFDOS	0.257 J				0.388		66.1	30-138		
4:2FTS	1.53 J				1.50		102	52-158		
6:2FTS	1.50 J				1.52		98.7	48-158		
8:2FTS	1.56 J				1.54		102	46-165		
PFOSA	0.464				0.400		116	47-163		
NMeFOSA	1.49 J				1.60		93.0	54-155		
NETFOSA	1.33 J				1.60		83.2	49-156		
NMeFOSAA	0.336 J				0.400		84.0	32-160		
NETFOSAA	0.333 J				0.400		83.3	51-154		
NMeFOSE	1.65				1.60		103	56-151		
NETFOSE	1.59 J				1.60		99.2	60-147		
HFPO-DA	0.808				0.800		101	58-154		
ADONA	0.783 J				0.756		104	61-148		
PFEESA	0.708 J				0.712		99.4	56-144		
PFMPA	0.800 J				0.800		100	48-150		
PFMBA	0.796 J				0.800		99.5	49-154		
NFDHA	0.925				0.800		116	47-160		
9CL-PF3ONS	0.944				0.748		126	44-167		
11CL-PF3OUDS	1.09				0.756		144	36-158		
3:3FTCA	1.57 J				1.60		97.9	32-161		
5:3FTCA	1.36 J				1.60		85.0	39-156		
7:3FTCA	1.73				1.60		108	36-149		
<b>Surrogates</b>										
13C4-PFBA	27.8				32.0		86.8	10-130		
13C5-PFPEA	17.7				16.0		111	35-150		
13C5-PFHXA	9.62				8.00		120	55-150		
13C4-PFHPA	10.5				8.00		131	55-150		
13C8-PFOA	7.31				8.00		91.4	60-140		
13C9-PFNA	3.38				4.00		84.5	55-140		

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

Reported: 03/21/2023 19:11

**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 (BCC0285-MRL1)</b>							Prepared: 03/15/23 10:17	Analyzed: 03/18/23 03:14		
<i>Surrogates</i>										
13C6-PFDA	3.53				4.00		88.3	50-140		
13C7-PFUnA	3.28				4.00		82.0	30-140		
13C2-PFDOA	3.23				4.00		80.7	10-150		
13C2-PFTEDA	2.84				4.00		70.9	10-130		
13C3-PFBS	6.47				8.00		80.9	55-150		
13C3-PFHXS	7.10				8.00		88.7	55-150		
13C8-PFOS	6.86				8.00		85.7	45-140		
13C2-4:2FTS	33.0 S2				16.0		206	60-200		
13C2-6:2FTS	16.4				16.0		103	60-200		
13C2-8:2FTS	17.4				16.0		109	50-200		
13C8-PFOA	4.88				8.00		60.9	30-130		
D3-NMEFOA	2.67				8.00		33.4	15-130		
D5-NETFOA	2.80				8.00		35.0	10-130		
D3-NMEFOSAA	13.8				16.0		86.4	45-200		
D5-NETFOSAA	10.2				16.0		63.9	10-200		
D7-NMEFOSE	33.0				80.0		41.2	10-150		
D9-NETFOSSE	42.2				80.0		52.8	10-150		
13C3-HFPO-DA	36.5				32.0		114	25-160		

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

Reported: 03/21/2023 19:11

## Notes and Definitions

Item	Definition
BS2	Blank spike recovered above the upper control limit
CV1	Calibration verification recovered below the lower control limit
CV2	Calibration verification recovered above the upper control limit
IR2	Ion ratio above the upper control limit
IS1	Internal standard recovered below the lower control limit
J	Estimated value
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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Project: Red Hill AFFF Assessment Sampling  
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Reported: 03/21/2023 19:11



# WORK ORDER

**23C0113**

Printed: 03/21/2023 7:11 pm

**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: 03/14/2023 09:55 AM  
 Date Due: 03/21/2023 (5.00 day TAT)

Logged In By: Megan Salata  
 Received By: Megan Salata

Analysis	Comments
<b>23C0113-01 AF-RHMW17-WGN01LF-2303W1 [Water] Sampled 3/10/2023 1:35:00PM</b> 1633 NONE	"Report relevant surrogates"
<b>23C0113-02 AF-RHMW17D-WGN01LF-2303W1 [Water] Sampled 3/10/2023 12:15:00PM</b> 1633 NONE	"Report relevant surrogates"
<b>23C0113-03 AF-RHMW17D-WQFB01-2303W1 [Water] Sampled 3/10/2023 11:30:00AM</b> 1633 NONE	"Report relevant surrogates"
<b>23C0113-04 AF-RHMW17S-WGN01LF-2303W1 [Water] Sampled 3/10/2023 11:10:00AM</b> 1633 NONE	"Report relevant surrogates"
<b>23C0113-05 AF-RHMW17S-WQEB01-2303W1 [Water] Sampled 3/10/2023 2:45:00PM</b> 1633 NONE	"Report relevant surrogates"

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

Reported: 03/21/2023 19:11

**23C0113**

**Sample Receipt Log**

**Default Cooler**

Samples Received at: **3.0°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. 2303W1AFAL10

23C0113

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)			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.:	
Sample Identification		Location	Date Collected	Time Collected	Time Zone												Comments: EDMS upload database: JBPHE EDMS Coverage: AFFF Assessment Sampling GW	
CTO N6274223F0104 / 60697810		<i>Olina Shively</i>			2	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>								
<u>AF-RHMW17-WGN01LF-2303W1</u>		<u>RHMW17</u>	<u>3/10/23</u>	<u>1335</u>		<u>HST</u>												

3/10/23 *[Signature]*

Shuttle Temperature: RI@4/3°C

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: *Olina Shively*  
 Date: 3/10/23   Time: 1435  
 Received by: *James Mason*

Relinquished by: *James Mason*   Date: 3/13/23   Time: 1250  
 Received by: \_\_\_\_\_

Relinquished by: \_\_\_\_\_   Date: 3/14/23   Time: 0155  
 Received at lab by: *[Signature]*

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

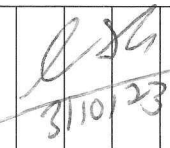


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Report to: PLEASE PRINT  
 Company Name: AECOM Phone: 808-954-4512 / 303-796-4624  
 Address: 1001 Bishop St ste1600  
Honolulu, HI 96813 Fax: \_\_\_\_\_  
 Attn: Watson Tanji / Katie Abbott  
 Email: watson.tanji@aecom.com/katie.abbott@aecom.com

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	Olivia Shively		No. of Containers	Matrix			PFAS EPA Draft 1633	<del>  </del>				Carrier:
Purchase Order Number	Sampler (Signature) OJL			Aq	Sed.	Soil						Waybill No.:
Sample Identification	Location	Date Collected	Time Collected	Time Zone					Comments: EDMS upload database: JBPHE			
AF-RHMW17D-WGN01LF-2303W1	RHMW17D	3/10/23	1215	HST	2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	EDMS Coverage: AFFF Assessment Sampling GW
AF-RHMW17D-WQFB01-2303W1	RHMW17D	3/10/23	1130	HST	2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

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: Olivia Shively Date: 3/10/23 Time: 1435  
 Received by: James Mason Relinquished by: James Mason Date: 3/13/23 Time: 1250  
 Relinquished by: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ Received at lab by: \_\_\_\_\_  
3/14/23 PS

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





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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:		
	Purchase Order Number	Sampler (Signature)	No. of Containers	Matrix			PFAS EPA Draft 1633	310123					Carrier:		
Sample Identification	Location	Date Collected		Time Collected	Time Zone	Aq		Sed.	Soil						Waybill No.:
CTO N6274223F0104 / 60697810	<u>Oliver Shively</u>														Comments: EDMS upload database: JBPHE EDMS Coverage: AFFF Assessment Sampling GW
AF-RHMW17S-WGN01LF-2303W1	<u>RHMW17S</u>	<u>3/10/23</u>	<u>1110</u>	<u>HST</u>	<u>2</u>	<input checked="" type="checkbox"/>									
AF-RHMW17S-WQEB01-2303W1	<u>RHMW17S</u>	<u>3/10/23</u>	<u>1445</u>	<u>HST</u>	<u>2</u>	<input checked="" type="checkbox"/>									
<u>3/10/23</u>															

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: [Signature] Date: 3/10/23 Time: 1455 Received by: James Mason  
 Relinquished by: James Mason Date: 3/13/23 Time: 1250 Received by: \_\_\_\_\_

Relinquished by: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ Received at lab by: [Signature]

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: M Date 3/13/23  
1250