

# ANALYTICAL REPORT

## PREPARED FOR

Attn: Terri Choy

AECOM

1001 Bishop Street

Honolulu, Hawaii 96813

Generated 2/22/2023 2:47:35 PM

## JOB DESCRIPTION

Red Hill - AFFF Assessment Sampling

## JOB NUMBER

580-123620-2

# Eurofins Seattle

## Job Notes

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The data in the report relate to the field sample(s) as received by the laboratory and associated QC. All results have been reviewed and have been found to be compliant with laboratory and accreditation requirements, with the exception of the noted deviation(s). For questions, please contact the Project Manager.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northwest, LLC Project Manager.

## Authorization



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Authorized for release by  
Marie Walker, Senior Project Manager  
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(253)248-4972

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# Case Narrative

Client: AECOM  
Project/Site: Red Hill - AFFF Assessment Sampling

Job ID: 580-123620-2

**Job ID: 580-123620-2**

**Laboratory: Eurofins Seattle**

## Narrative

### CASE NARRATIVE

Client: AECOM

Project: Red Hill - AFFF Assessment Sampling

Report Number: 580-123620-2

This case narrative is in the form of an exception report, where only the anomalies related to this report, method specific performance and/or QA/QC issues are discussed. If there are no issues to report, this narrative will include a statement that documents that there are no relevant data issues.

It should be noted that samples with elevated Reporting Limits (RLs) resulting from a dilution may not be able to satisfy customer reporting limits in some cases. Such increases in the RLs are an unavoidable but acceptable consequence of sample dilution that enables quantification of target analytes within the calibration range of the instrument or that reduces the interferences thereby enabling the quantification of target analytes.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### RECEIPT

The samples were received on 02/15/2023; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.1 C.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2C of the required temperature or method specified range. For samples with a specified temperature of 4C, samples with a temperature ranging from just above freezing temperature of water to 6C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

### GLYCOLS

Samples AF-RHMW17D-WGN01LF-2302W1 (580-123620-3), AF-RHMW17D-WQFB01-2302W1 (580-123620-4), AF-RHMW225401-WGN01B-2302W1 (580-123620-5) and AF-RHMW17-WGN01LF-2302W1 (580-123620-6) were analyzed for glycols in accordance with EPA SW-846 Method 8015B - DAI. The samples were analyzed on 02/21/2023.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Definitions/Glossary

Client: AECOM

Job ID: 580-123620-2

Project/Site: Red Hill - AFFF Assessment Sampling

### Qualifiers

#### GC Semi VOA

Qualifier	Qualifier Description
M	Manual integrated compound.
U	Undetected at the Limit of Detection.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Client Sample Results

Client: AECOM

Job ID: 580-123620-2

Project/Site: Red Hill - AFFF Assessment Sampling

**Client Sample ID: AF-RHMW17D-WGN01LF-2302W1**

**Lab Sample ID: 580-123620-3**

**Date Collected: 02/10/23 12:15**

**Matrix: Water**

**Date Received: 02/15/23 11:00**

**Method: SW846 8015C GLY - Glycols- Direct Injection (GC/FID)**

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
2-(2-Butoxyethoxy)ethanol	3.0	U M	5.0	1.1	mg/L			02/21/23 01:22	1

# Client Sample Results

Client: AECOM

Job ID: 580-123620-2

Project/Site: Red Hill - AFFF Assessment Sampling

**Client Sample ID: AF-RHMW17D-WQFB01-2302W1**

**Lab Sample ID: 580-123620-4**

**Date Collected: 02/10/23 11:30**

**Matrix: Water**

**Date Received: 02/15/23 11:00**

**Method: SW846 8015C GLY - Glycols- Direct Injection (GC/FID)**

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
2-(2-Butoxyethoxy)ethanol	3.0	U	5.0	1.1	mg/L			02/21/23 01:45	1

# Client Sample Results

Client: AECOM

Job ID: 580-123620-2

Project/Site: Red Hill - AFFF Assessment Sampling

**Client Sample ID: AF-RHMW225401-WGN01B-2302W1**

**Lab Sample ID: 580-123620-5**

**Date Collected: 02/10/23 08:55**

**Matrix: Water**

**Date Received: 02/15/23 11:00**

**Method: SW846 8015C GLY - Glycols- Direct Injection (GC/FID)**

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
2-(2-Butoxyethoxy)ethanol	3.0	U M	5.0	1.1	mg/L			02/21/23 02:08	1



# Client Sample Results

Client: AECOM

Job ID: 580-123620-2

Project/Site: Red Hill - AFFF Assessment Sampling

**Client Sample ID: AF-RHMW17-WGN01LF-2302W1**

**Lab Sample ID: 580-123620-6**

**Date Collected: 02/10/23 11:00**

**Matrix: Water**

**Date Received: 02/15/23 11:00**

**Method: SW846 8015C GLY - Glycols- Direct Injection (GC/FID)**

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
2-(2-Butoxyethoxy)ethanol	3.0	U	5.0	1.1	mg/L			02/21/23 02:32	1

# QC Sample Results

Client: AECOM

Job ID: 580-123620-2

Project/Site: Red Hill - AFFF Assessment Sampling

## Method: 8015C GLY - Glycols- Direct Injection (GC/FID)

Lab Sample ID: MB 680-764187/14

Matrix: Water

Analysis Batch: 764187

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
2-(2-Butoxyethoxy)ethanol	3.0	U M	5.0	1.1	mg/L			02/20/23 23:25	1

Lab Sample ID: LCS 680-764187/10

Matrix: Water

Analysis Batch: 764187

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
2-(2-Butoxyethoxy)ethanol	20.0	23.6		mg/L		118	50 - 150

Lab Sample ID: LCSD 680-764187/11

Matrix: Water

Analysis Batch: 764187

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
2-(2-Butoxyethoxy)ethanol	20.0	24.5		mg/L		122	50 - 150	4	50

# Lab Chronicle

Client: AECOM

Job ID: 580-123620-2

Project/Site: Red Hill - AFFF Assessment Sampling

**Client Sample ID: AF-RHMW17D-WGN01LF-2302W1**

**Lab Sample ID: 580-123620-3**

**Date Collected: 02/10/23 12:15**

**Matrix: Water**

**Date Received: 02/15/23 11:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8015C GLY		1	764187	JCK	EET SAV	02/21/23 01:22

**Client Sample ID: AF-RHMW17D-WQFB01-2302W1**

**Lab Sample ID: 580-123620-4**

**Date Collected: 02/10/23 11:30**

**Matrix: Water**

**Date Received: 02/15/23 11:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8015C GLY		1	764187	JCK	EET SAV	02/21/23 01:45

**Client Sample ID: AF-RHMW225401-WGN01B-2302W1**

**Lab Sample ID: 580-123620-5**

**Date Collected: 02/10/23 08:55**

**Matrix: Water**

**Date Received: 02/15/23 11:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8015C GLY		1	764187	JCK	EET SAV	02/21/23 02:08

**Client Sample ID: AF-RHMW17-WGN01LF-2302W1**

**Lab Sample ID: 580-123620-6**

**Date Collected: 02/10/23 11:00**

**Matrix: Water**

**Date Received: 02/15/23 11:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8015C GLY		1	764187	JCK	EET SAV	02/21/23 02:32

## Laboratory References:

EET SAV = Eurofins Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

# Accreditation/Certification Summary

Client: AECOM  
Project/Site: Red Hill - AFFF Assessment Sampling

Job ID: 580-123620-2

## Laboratory: Eurofins Savannah

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2463	09-22-24
The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.			
Analysis Method	Prep Method	Matrix	Analyte
8015C GLY		Water	2-(2-Butoxyethoxy)ethanol

# Sample Summary

Client: AECOM

Job ID: 580-123620-2

Project/Site: Red Hill - AFFF Assessment Sampling

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-123620-3	AF-RHWMW17D-WGN01LF-2302W1	Water	02/10/23 12:15	02/15/23 11:00
580-123620-4	AF-RHWMW17D-WQFB01-2302W1	Water	02/10/23 11:30	02/15/23 11:00
580-123620-5	AF-RHWMW225401-WGN01B-2302W1	Water	02/10/23 08:55	02/15/23 11:00
580-123620-6	AF-RHWMW17-WGN01LF-2302W1	Water	02/10/23 11:00	02/15/23 11:00

Ver: 01/16/2019

2/22/2023

## Chain of Custody Record

[illegible]



## Chain of Custody Record

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## Chain of Custody Record


<b>Client Information</b> Client Contact: <u>Andy Young</u> Phone: <u>402-871-5712</u>		Lab POC: <u>Elaine Walker</u> E-Mail: <u>M.Elaine.Walker@EurofinsET.com</u>		Carrier Tracking No(s): <u>2302W2AFEA08</u> State of Origin: <u>Hawaii</u>		COC No: <u>2302W2AFEA08</u> Page: <u>Page 1 of 1</u>	
Company: <u>AECOM</u> Address: <u>1001 Bishop St. Suite 1600</u> City: <u>Honolulu</u> State: <u>HI</u> Zip: <u>96813</u> Phone: <u>808-954-4512 / 770-331-0794</u> Email: <u>Watson.Tanji@aecom.com / Mark.Kronis@aecom.com</u> Project Name: <u>CTO N6274223F0104</u> Site: <u>RHSF</u>		PWSID: <u>                    </u> Due Date Requested: <u>                    </u> See subcontract <u>                    </u> TAT requested (days): <u>                    </u> Compliance Project: <u>                    </u> PO #: <u>                    </u> WO #: <u>                    </u> Project #: <u>60697810</u> SSOW#: <u>                    </u>		<b>Analysis Requested</b> Rush - ASAP Matrix: <u>                    </u> Sample Type: <u>                    </u> Sample Date: <u>2/13/23</u> Sample Time: <u>1030</u> Preservation Code: <u>                    </u>		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA M - Hexane N - None O - AsNaO2 P - Na2SO4 Q - Na2SO3 R - Na2SO3 S - H2SO4 T - TSP Dodecylhydriate U - Acetone V - MCAA W - pH 4-5 X - other (Specify) Other: <u>                    </u>	
<b>Sample Identification</b> AF-RHMW04-WGND1LF-2302W2		Sample Date: <u>2/13/23</u> Sample Time: <u>1030</u> Sample Type: <u>G</u> Preservation Code: <u>                    </u>		Matrix: <u>                    </u> Sample Type: <u>                    </u> Sample Date: <u>2/13/23</u> Sample Time: <u>1030</u> Sample Type: <u>G</u> Preservation Code: <u>                    </u>		Field Filtered Sample (Yes or No) <u>                    </u> Perform MS/MSD (Yes or No) <u>                    </u> 8015C, DAI, GL, DS/2-(2-butoxyethoxy)-ethanol <u>                    </u>	
Total Number of Containers: <u>3</u>		Special Instructions/Note: <u>                    </u>		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For <u>                    </u> Months		Special Instructions/OC Requirements: <u>DOD QSM project</u>	
Empty Kit Relinquished by: <u>                    </u>		Relinquished by: <u>                    </u>		Relinquished by: <u>                    </u>		Relinquished by: <u>                    </u>	
Date/Time: <u>2/13/23 1305</u>		Date/Time: <u>2/13/23 1305</u>		Date/Time: <u>2/13/23 1305</u>		Date/Time: <u>2/13/23 1305</u>	
Company: <u>AECOM</u>		Company: <u>AECOM</u>		Company: <u>AECOM</u>		Company: <u>AECOM</u>	
Date/Time: <u>2/13/23 1305</u>		Date/Time: <u>2/13/23 1305</u>		Date/Time: <u>2/13/23 1305</u>		Date/Time: <u>2/13/23 1305</u>	
Relinquished by: <u>                    </u>		Relinquished by: <u>                    </u>		Relinquished by: <u>                    </u>		Relinquished by: <u>                    </u>	
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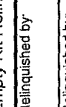

## Chain of Custody Record

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Eurofins FGS, Seattle  
5755 8th Street East  
Tacoma, WA 98424

 Eurofins  
Environment Testing  
America

## Chain of Custody Record

Client Information		Lab PM	Carrier Tracking No(s)	COC No:	
Client Contact:		Eliane Walker	FedEx	2302W1AEEA13	
Company: AECOM		E-Mail: M.Eliane.Walker@EurofinsET.com	State of Origin: Hawaii	Page: 1 of 1	
Address: 1001 Bishop St, Suite 1600		Job #:			
City: Honolulu		Analysis Requested			
State Zip: Hawaii 96813		Preservation Codes			
Phone: 808-954-4512 / 770-331-0794		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA M - Hexane N - None O - AsNaO2 P - Na2SO4 Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MC4A W - pH 4-5 Z - other (specify)			
Email: Walsen Tanji (walsen.tanji@aecom.com) / Mark Kromis (mark.kromis@aecom.com)		Total Number of containers			
Project Name: CTO N6274223F0104		3			
Site: RH5F		Special Instructions/Note:			
Due Date Requested: see subcontract		8015C_DAL_GL_DS/2-(2-butoxyethoxy)-ethanol			
TAT Requested (days): Rush - ASAP		Perform MS/MSD (Yes or No)			
Compliance Project: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Field Filtered Sample (Yes or No)			
PO #:		A			
WO #:		N			
Project #:		X			
SSOW#:		N			
Sample Identification		Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (Water, Sediment, Soil, Air, etc.)
AF-RHMMW225401-WGN01B-2302W1		2.10.23	0855	G	W
Possible Hazard Identification		Preservation Code: A			
<input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input checked="" type="checkbox"/> Radiological		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)			
Deliverable Requested: I, II, III, IV Other (specify)		<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months			
Empty Kit Relinquished by: 		Special Instructions/QC Requirements: DOD QSM project.			
Relinquished by: 		Method of Shipment:			
Relinquished by: Miranda DeGarmo		Date/Time: 2/10/23 1315	Date/Time: 2/10/23 1315	Company: AECOM	
Relinquished by: 		Date/Time: 2/13/23 1140	Date/Time: 2/13/23 1100	Company: AECOM	
Custody Seals Intact: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Cooler Temperature(s) °C and Other Remarks: 2.1/2-1			



## Chain of Custody Record

[illegible]

## Login Sample Receipt Checklist

Client: AECOM

Job Number: 580-123620-2

**Login Number: 123620**

**List Number: 2**

**Creator: Johnson, Corey M**

**List Source: Eurofins Savannah**

**List Creation: 02/17/23 11:30 AM**

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	