



# ANALYTICAL REPORT

## PREPARED FOR

Attn: Terri Choy  
AECOM  
1001 Bishop Street  
Honolulu, Hawaii 96813  
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## JOB DESCRIPTION

Red Hill - AFFF Assessment Sampling

## JOB NUMBER

580-121536-1

## 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  
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# Case Narrative

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

Job ID: 580-121536-1

**Job ID: 580-121536-1**

**Laboratory: Eurofins Seattle**

**Narrative**

## CASE NARRATIVE

Client: AECOM

Project: Red Hill - AFFF Assessment Sampling

Report Number: 580-121536-1

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

Two samples were received on 12/22/2022; 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 - 2-(2-BUTOXYETHOXY)ETHANOL

Samples AF-RHMW12A-WGN01LF-2212W3 (580-121536-1) and AF-RHMW12A-WGFD01LF-2212W3 (580-121536-2) were analyzed for glycols in accordance with EPA SW-846 Method 8015B - DAI. The samples were analyzed on 12/31/2022.

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

# Definitions/Glossary

Client: AECOM

Job ID: 580-121536-1

Project/Site: Red Hill - AFFF Assessment Sampling

## Qualifiers

### GC Semi VOA

Qualifier	Qualifier Description
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: 580-121536-1

Project/Site: Red Hill - AFFF Assessment Sampling

**Client Sample ID: AF-RHMW12A-WGN01LF-2212W3**

**Lab Sample ID: 580-121536-1**

**Date Collected: 12/21/22 10:45**

**Matrix: Water**

**Date Received: 12/22/22 14:15**

**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			12/31/22 20:46	1

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11

# Client Sample Results

Client: AECOM

Job ID: 580-121536-1

Project/Site: Red Hill - AFFF Assessment Sampling

**Client Sample ID: AF-RHMW12A-WGFD01LF-2212W3**

**Lab Sample ID: 580-121536-2**

**Date Collected: 12/21/22 10:45**

**Matrix: Water**

**Date Received: 12/22/22 14:15**

**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			12/31/22 21:09	1

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11

# QC Sample Results

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

Job ID: 580-121536-1

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

**Lab Sample ID: MB 680-757531/16**  
**Matrix: Water**  
**Analysis Batch: 757531**

**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	5.0	1.1	mg/L			12/31/22 18:08	1

**Lab Sample ID: LCS 680-757531/12**  
**Matrix: Water**  
**Analysis Batch: 757531**

**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	20.7		mg/L		104	50 - 150

**Lab Sample ID: LCSD 680-757531/13**  
**Matrix: Water**  
**Analysis Batch: 757531**

**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	21.6		mg/L		108	50 - 150	4	50



# Lab Chronicle

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

Job ID: 580-121536-1

**Client Sample ID: AF-RHMW12A-WGN01LF-2212W3**

**Lab Sample ID: 580-121536-1**

**Date Collected: 12/21/22 10:45**

**Matrix: Water**

**Date Received: 12/22/22 14:15**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8015C GLY		1	757531	JCK	EET SAV	12/31/22 20:46

**Client Sample ID: AF-RHMW12A-WGFD01LF-2212W3**

**Lab Sample ID: 580-121536-2**

**Date Collected: 12/21/22 10:45**

**Matrix: Water**

**Date Received: 12/22/22 14:15**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8015C GLY		1	757531	JCK	EET SAV	12/31/22 21:09

**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: 580-121536-1

## 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

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11

# Sample Summary

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

Job ID: 580-121536-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-121536-1	AF-RHMW12A-WGN01LF-2212W3	Water	12/21/22 10:45	12/22/22 14:15
580-121536-2	AF-RHMW12A-WGFD01LF-2212W3	Water	12/21/22 10:45	12/22/22 14:15

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11

### Chain of Custody Record

<b>Client Information</b> Client Contact: <b>CHRIS WOMACK</b>				Lab PM: <b>Elaine Walker</b>	Carrier Tracking No(s): <b>FedEx</b>	COC No: <b>01-221221-23F0104-EUSav</b>								
Phone: <b>(916) 769-9323</b>				E-Mail: <b>M.Elaine.Walker@EurofinsET.com</b>	State of Origin: <b>Hawaii</b>	Page: Page 1 of 1								
Company: <b>AECOM</b>			PWSID:	<b>Analysis Requested</b>										
Address: <b>1001 Bishop St. Suite 1600</b>			<table style="width: 100%; height: 100%; border: none;"> <tr> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Field Filtered Sample (Yes or No)</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Perform MS/MSD (Yes or No)</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">8015C, DAL, GL, D5/2-(2-butoxyethoxy)-ethanol</td> <td colspan="2" style="font-size: 48px; text-align: center; vertical-align: middle;"><b>MD 12/21/22</b></td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Total Number of Containers</td> </tr> </table>				Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015C, DAL, GL, D5/2-(2-butoxyethoxy)-ethanol	<b>MD 12/21/22</b>		Total Number of Containers	Job #:	
Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015C, DAL, GL, D5/2-(2-butoxyethoxy)-ethanol					<b>MD 12/21/22</b>		Total Number of Containers					
City: <b>Honolulu</b>							Due Date Requested: <b>See subcontract</b>		Preservation Codes:					
State, Zip: <b>Hawaii 96813</b>							TAT Requested (days): <b>Rush - ASAP</b>		A - HCL            M - Hexane B - NaOH        N - None C - Zn Acetate   O - AsNaO2 D - Nitric Acid   P - Na2O4S E - NaHSO4      Q - Na2SO3 F - MeOH        R - Na2S2O3 G - Amchlor     S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate I - Ice            U - Acetone J - DI Water     V - MCAA K - EDTA        W - pH 4-5 L - EDTA        Z - other (specify)					
Phone: <b>808-954-4512 / 808-356-5311</b>							Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No		Other:					
Email: <b>Watson Tanji (watson.tanji@aecom.com) / Brant Landers (brant.landiers@aecom.com)</b>			PO #:											
Project Name: <b>CTO N6274223F0104</b>			Project #: <b>60697810</b>		Special Instructions/Note:									
Site: <b>RHSF</b>			SSOW#:											

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, Seawater, Oil/waste/oil, BT=Tissue, Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015C	DAL	GL	D5/2	2-(2-butoxyethoxy)-ethanol	Total Number of Containers	Special Instructions/Note
<del>AF-RHMW 12A-WGN01LF-2212W3</del>													
AF-RHMW 12A-WGN01LF-2212W3	12/21/22	1045	G	W	N	N	X					3	
AF-RHMW 12A-WGF001LF-2212W3	12/21/22	1045	G	W	N	N	X					3	
<del>AF-RHMW 12A-WGF001LF-2212W3</del>													

**580-121536 Chain of Custody**

<b>Possible Hazard Identification</b> <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 type="checkbox"/> Radiological			<b>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</b> <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months		
Deliverable Requested: I, II, III, IV, Other (specify)			Prelim data (Level 1or2)=see TAT above. DoD Stage 4 report standard TAT. AECOM EQUIS EDD.		

<b>Empty Kit Relinquished by:</b>		<b>Date:</b>		<b>Time:</b>		<b>Method of Shipment:</b>	
Relinquished by: <b>CHRIS WOMACK</b>	Date/Time: <b>12/21/22</b>	<b>1340</b>	Company: <b>AECOM</b>	Received by: <b>Miranda Debarros</b>	Date/Time: <b>12/21/22</b>	<b>1340</b>	Company: <b>AECOM</b>
Relinquished by: <b>Miranda Debarros</b>	Date/Time: <b>12/21/22</b>	<b>1350</b>	Company: <b>AECOM</b>	Received by: <b>WOMACK</b>	Date/Time: <b>12/22/22</b>	<b>1415</b>	Company: <b>AETN</b>

Custody Seals Intact:    Custody Seal No.:    Cooler Temperature(s) °C and Other Remarks:    **IR10 2.1/2.3**



# Login Sample Receipt Checklist

Client: AECOM

Job Number: 580-121536-1

**Login Number: 121536**

**List Number: 1**

**Creator: Vallelunga, Diana L**

**List Source: Eurofins Seattle**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> 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.	N/A	
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.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



# Login Sample Receipt Checklist

Client: AECOM

Job Number: 580-121536-1

**Login Number: 121536**

**List Number: 2**

**Creator: Harley, Tynisha**

**List Source: Eurofins Savannah**

**List Creation: 12/29/22 11:43 AM**

Question	Answer	Comment
Radioactivity wasn't checked or is </= 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 <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	