

 **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

580-121381-1

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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Case Narrative

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

Job ID: 580-121381-1

Job ID: 580-121381-1

Laboratory: Eurofins Seattle

Narrative

CASE NARRATIVE

Client: AECOM
Project: Red Hill - AFFF Assessment Sampling
Report Number: 580-121381-1

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.

Following DoD QSM guidelines, manual integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure, Acceptable Manual Integration Practices, SOP No.: Q-S-002. The reason(s) for manual integration have been documented on the affected chromatogram(s), which is/are provided in the raw data package. The raw data also includes the original chromatogram(s) prior to any manual integration being performed. Manual integrations are detailed in the manual integration summary forms following this narrative.

It should be noted that samples with elevated Limits of Quantitation (LOQs) resulting from a dilution may not be able to satisfy customer reporting limits in some cases. Such increases in the LOQs 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 12/17/2022; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.0 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-RHMW04-WGN01B-2212W2 (580-121381-1) and AF-RHMW10-WGN01B-2212W2 (580-121381-2) were analyzed for glycols in accordance with EPA SW-846 Method 8015B - DAI. The samples were analyzed on 12/21/2022.

The continuing calibration verification (CCV) associated with batch 680-756409 recovered above the upper control limit for 2-(2-Butoxyethoxy)ethanol. The samples associated with this CCV were non-detects for the affected analyte; therefore, the data has been reported.

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

Definitions/Glossary

Client: AECOM

Job ID: 580-121381-1

Project/Site: Red Hill - AFFF Assessment Sampling

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
M	Manual integrated compound.
Q	One or more quality control criteria failed.
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
Project/Site: Red Hill - AFFF Assessment Sampling

Job ID: 580-121381-1

Client Sample ID: AF-RHMW04-WGN01B-2212W2

Lab Sample ID: 580-121381-1

Date Collected: 12/15/22 11:20

Matrix: Water

Date Received: 12/17/22 09:00

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 Q	5.0	1.1	mg/L			12/21/22 20:58	1

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

Client Sample Results

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

Job ID: 580-121381-1

Client Sample ID: AF-RHMW10-WGN01B-2212W2

Lab Sample ID: 580-121381-2

Date Collected: 12/15/22 15:35

Matrix: Water

Date Received: 12/17/22 09:00

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 Q	5.0	1.1	mg/L			12/21/22 21:20	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: 580-121381-1

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

Lab Sample ID: MB 680-756409/10
Matrix: Water
Analysis Batch: 756409

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			12/21/22 19:50	1

Lab Sample ID: LCS 680-756409/6
Matrix: Water
Analysis Batch: 756409

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	26.2		mg/L		131	50 - 150

Lab Sample ID: LCSD 680-756409/7
Matrix: Water
Analysis Batch: 756409

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	24.6		mg/L		123	50 - 150	6	50

Lab Chronicle

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

Job ID: 580-121381-1

Client Sample ID: AF-RHMW04-WGN01B-2212W2

Lab Sample ID: 580-121381-1

Date Collected: 12/15/22 11:20

Matrix: Water

Date Received: 12/17/22 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8015C GLY		1	756409	GEM	EET SAV	12/21/22 20:58

Client Sample ID: AF-RHMW10-WGN01B-2212W2

Lab Sample ID: 580-121381-2

Date Collected: 12/15/22 15:35

Matrix: Water

Date Received: 12/17/22 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8015C GLY		1	756409	GEM	EET SAV	12/21/22 21:20

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: 580-121381-1

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: 580-121381-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-121381-1	AF-RHMW04-WGN01B-2212W2	Water	12/15/22 11:20	12/17/22 09:00
580-121381-2	AF-RHMW10-WGN01B-2212W2	Water	12/15/22 15:35	12/17/22 09:00

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Eurofins FGS, Seattle

5755 8th Street East
Tacoma, WA 98424

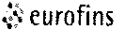
Chain of Custody Record

Client Information		Sampler: <u>Aaron Oliver</u>		Lab PM: Elaine Walker		Carrier Tracking No(s): FedEx		COC No: 01-221215-23F0104-EUSav			
Client Contact:		Phone: <u>314-585-7610</u>		E-Mail: M.Elaine.Walker@EurofinsET.com		State of Origin: Hawaii		Page: Page 1 of 1			
Company: AECOM		PWSID:		Analysis Requested					Job #:		
Address: 1001 Bishop St. Suite 1600		Due Date Requested: see subcontract		Total Number of containers MD 12/15/22 8015C DAL GL D51 2-(2-butoxyethoxy)-ethanol					Preservation Codes: 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 - EDA Z - other (specify) Other:		
City: Honolulu		TAT Requested (days): Rush - ASAP									
State, Zip: Hawaii 96813		Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No									
Phone: 808-954-4512 / 808-356-5311		PO #:									
Email: Watson Tanji (watson.tanji@aecom.com) / Brant Landers (brant.landiers@aecom.com)		WO #:									
Project Name: CTO N6274223F0104		Project #: 60697810		Field Filtered Sample (Yes or No)		Perform MS/MSD (Yes or No)					
Site: RHSF		SSOW#:									
Sample Identification		Sample Date		Sample Time		Sample Type (C=Comp, G=grab)		Matrix (W=water, S=solid, O=waste/soil, BT=Tissue, A=Air)			
		Preservation Code:									
AF-RHMW04-WGN01B-2212W2		12/15/22		1120		G		W			
						N		N X			
								3			
								Special Instructions/Note: Store ALL samples until notified by client to dispose MD			
								Therm. ID: <u>A3</u> Cor: <u>2.0</u> ° Unc: <u>1.9</u> ° Cooler Dsc: <u>jar</u> Packing: <u>BWP</u> FedEx: <u>P.O</u> Cust. Seal: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> UPS: Blue Ice, Wet, Dry, None Lab Cour: Other:			
Possible Hazard Identification					Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)						
<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					<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.						
Special Instructions/QC Requirements: DOD QSM project.											
Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:					
Relinquished by: <u>[Signature]</u>		Date/Time: <u>12/15/22 1720</u>		Company: AECOM		Received by: <u>Miranda Debarmo</u>		Date/Time: <u>12/15/22 1720</u>		Company: AECOM	
Relinquished by: <u>Miranda Debarmo</u>		Date/Time: <u>12/16/22 1325</u>		Company: AECOM		Received by: <u>[Signature]</u>		Date/Time: <u>12/17/22 0900</u>		Company: AECOM	
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:		Company:	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:						Cooler Temperature(s) °C and Other Remarks:			

3672
12/27/2022
12/17/22

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

Chain of Custody Record

 **eurofins**
 Environment Testing
 America

Client Information Client Contact:		Sampler: <u>Aaron Omer</u>		Lab PM: <u>Elaine Walker</u>		Carrier Tracking No(s): <u>02-221215-23 F0104</u> - EUSAV		COC No: <u>02-221215-23 F0104</u>																							
Company: <u>AECOM</u>		Phone: <u>34-585-7610</u>		E-Mail: <u>M.Elaine.Walker@EurofinsET.com</u>		FedEx: <u>Hawaii</u>		Page: <u>Page 1 of 1</u>																							
Address: <u>1001 Bishop St. Suite 1600</u> City: <u>Honolulu</u> State, Zip: <u>Hawaii 96813</u> Phone: <u>808-954-4512 / 808-356-5311</u> Email: <u>Watson.Tanji (watson.tanji@aecom.com) / Brant.Landers (brant.landers@aecom.com)</u>		Due Date Requested: <u>see subcontract</u> TAT Requested (days): <u>Rush - ASAP</u> Compliance Project: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<table border="1"> <tr> <th colspan="2">Analysis Requested</th> <th rowspan="2">Field Filtered Sample (Yes or No)</th> <th rowspan="2">Perform: MS/MSD (Yes or No)</th> <th rowspan="2">8015C</th> <th rowspan="2">DAI</th> <th rowspan="2">GL</th> <th rowspan="2">DL</th> <th rowspan="2">D5</th> <th rowspan="2">2-(2-butoxyethoxy)-ethanol</th> </tr> <tr> <td colspan="10" style="text-align: center;"> MD 12/15/22 </td> </tr> </table>						Analysis Requested		Field Filtered Sample (Yes or No)	Perform: MS/MSD (Yes or No)	8015C	DAI	GL	DL	D5	2-(2-butoxyethoxy)-ethanol	MD 12/15/22										Preservation Codes: 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 - EDA Z - other (specify) Other: _____	
Analysis Requested		Field Filtered Sample (Yes or No)	Perform: MS/MSD (Yes or No)							8015C	DAI									GL	DL	D5	2-(2-butoxyethoxy)-ethanol								
MD 12/15/22																															
Project Name: <u>CTO N6274223F0104</u> Site: <u>RHSF</u>		Project #: <u>60697810</u> SSOW#:								Job #:																					
Sample Identification		Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=wastewater, BT=Tissue, AA=Air)	Field Filtered Sample (Yes or No)	Perform: MS/MSD (Yes or No)	8015C	DAI	GL	DL	D5	2-(2-butoxyethoxy)-ethanol	Total Number of Containers	Special Instructions/Note:																
<u>AF-RHMW10-WGN01B-2212W2</u>		<u>12/15/22</u>	<u>1535</u>	<u>G</u>	<u>W</u>	<u>N</u>	<u>N</u>	<u>X</u>						<u>3</u>	<u>Store ALL samples until notified by client to dispose</u>																
Possible Hazard Identification <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		Deliverable Requested: I, II, III, IV, Other (specify)		Prelim data (Level 1or2)=see TAT above. DoD Stage 4 report standard TAT. AECOM EQulS EDD.						Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months																					
Empty Kit Relinquished by: <u>Alan Ed...</u>		Date: <u>12/15/22</u>		Time: <u>1730</u>		Company: <u>AECOM</u>		Received by: <u>Miranda DeBarma</u>		Date/Time: <u>12/15/22 1710</u>		Company: <u>AECOM</u>		Method of Shipment:																	
Relinquished by: <u>Miranda DeBarma</u>		Date/Time: <u>12/16/22 1325</u>		Company: <u>AECOM</u>		Received by: <u>MD</u>		Date/Time: <u>12/17/22 0900</u>		Company: <u>AECOM</u>		Date/Time:		Company:																	
Custody Seals Intact: <input checked="" type="checkbox"/>		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:																											

Therm. ID: A3 Cor: 2.0 ° Unc: 1.9 °
 Cooler Dsc: IR FedEx: P.O.
 Packing: DAI UPS:
 Cust. Seal: Yes No
 Blue Ice, Wet, Dry, None Other:

Ver: 01/16/2019

Handwritten: 303
 12/27/2022
 12/15/22

Login Sample Receipt Checklist

Client: AECOM

Job Number: 580-121381-1

Login Number: 121381

List Number: 1

Creator: Presley, Kim A

List Source: Eurofins Seattle

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.	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 <6mm (1/4").	True	
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: 580-121381-1

Login Number: 121381

List Number: 2

Creator: Givens, Keshia

List Source: Eurofins Savannah

List Creation: 12/20/22 12:35 PM

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?	N/A	
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	