



LABORATORY DATA CONSULTANTS, INC.

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AECOM
250 Apollo Drive
Chelmsford, MA 01824
ATTN: Ms. Waverly Braunstein
waverly.braunstein@aecom.com

April 5, 2022

SUBJECT: Red Hill Bulk Storage Facility, CTO 18F0126- Data Validation

Dear Ms. Braunstein,

Enclosed is the final validation report for the fraction listed below. This SDG was received on December 16th & 17th, 2021. Attachment 1 is a summary of the samples that were reviewed for the analysis.

LDC Project #53055:

SDG #

Fraction

B21111298
B21111928
B21112212

Total Petroleum Hydrocarbons as Extractables

The data validation was performed under Stage 2B & 4 validation guidelines. The analysis was validated using the following documents and variances, as applicable to the method:

- Work Plan/Scope of Work, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 02, January 2017)
- Sampling and Analysis Plan, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 01, April 2017)
- Sampling and Analysis Plan, Addendum 01, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 00, September 2017)
- Sampling and Analysis Plan, Addendum 03, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 00, June 2018)
- U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3 (2019), the DoD General Validation Guidelines (November 2019)
- DoD General Validation Guidelines (November 2019)
- U.S. Department of Defense (DoD) Data Validation Guidelines Module 4: Data Validation Procedure for Organic Analysis by GC (March 2021)
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014; update VI, July 2018

Please feel free to contact us if you have any questions.

Sincerely,

Stella Cuenco
Operations Manager/Senior Chemist
scuenco@lab-data.com

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Red Hill Bulk Storage Facility, CTO 18F0126

LDC Report Date: March 28, 2022

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 2B & 4

Laboratory: Energy Laboratories, Billings, MT

Sample Delivery Group (SDG): B21111298

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
ERH1893(RHMW01R)**	B21111298-001**	Water	11/10/21
ERH1896(RHMW02)**	B21111298-002**	Water	11/10/21
ERH1899(RHMW03)**	B21111298-003**	Water	11/10/21
ERH1902(RHMW05)	B21111298-004	Water	11/10/21
ERH1905(RHM2254-01)	B21111298-005	Water	11/10/21
ERH1908(RHSF)	B21111298-006	Water	11/10/21
ERH1910(RHSF)	B21111298-007	Water	11/10/21
ERH1916(Post-Chlorination)	B21111298-008	Water	11/10/21
ERH1893(RHMW01R)(SGCU)**	B21111298-001(SGCU)**	Water	11/10/21
ERH1896(RHMW02)(SGCU)**	B21111298-002(SGCU)**	Water	11/10/21
ERH1899(RHMW03)(SGCU)**	B21111298-003(SGCU)**	Water	11/10/21
ERH1902(RHMW05)(SGCU)	B21111298-004(SGCU)	Water	11/10/21
ERH1905(RHM2254-01)(SGCU)	B21111298-005(SGCU)	Water	11/10/21
ERH1916(Post-Chlorination)(SGCU)	B21111298-008(SGCU)	Water	11/10/21
ERH1893(RHMW01R)MS	B21111298-001MS	Water	11/10/21
ERH1896(RHMW02)MS	B21111298-002MS	Water	11/10/21
ERH1893(RHMW01R)(SGCU)MS	B21111298-001(SGCU)MS	Water	11/10/21
ERH1896(RHMW02)(SGCU)MS	B21111298-002(SGCU)MS	Water	11/10/21

**Indicates sample underwent Stage 4 validation
Samples appended with SGCU underwent "Silica Gel Clean Up"

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Work Plan/Scope of Work, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 02, January 2017), the Sampling and Analysis Plan, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 01, April 2017), the Sampling and Analysis Plan, Addendum 01, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 00, September 2017), the Sampling and Analysis Plan, Addendum 03, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 00, June 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3 (2019), the DoD General Validation Guidelines (November 2019), and the U.S. Department of Defense (DoD) Data Validation Guidelines Module 4: Data Validation Procedure for Organic Analysis by GC (March 2021). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Total Petroleum Hydrocarbons (TPH) as Extractables by Environmental Protection Agency (EPA) SW 846 Method 8015C

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Stage 4 data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J+ (Estimated, High Bias): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.
- J- (Estimated, Low Bias): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.
- J (Estimated, Bias Indeterminate): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.
- U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The analyte was not detected and the associated numerical value is approximate.
- X (Exclusion of data recommended): The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Exclusion of the data is recommended.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

- a ICP Serial Dilution %D was not within control limits.
- b Presumed contamination from preparation (method blank).
- c Calibration %RSD, r, r², %D or %R was noncompliant.
- d The analysis with this flag should not be used because another more technically sound analysis is available.
- e MS/MSD or Duplicate RPD was high.
- f Presumed contamination from FB or ER.
- g ICP ICS results were unsatisfactory.
- h Holding times were exceeded.
- i Internal standard performance was unsatisfactory.
- k Estimated Maximum Possible Concentration (HRGC/HRMS only)
- l LCS/LCSD %R was not within control limits.
- m Result exceeded the calibration range.
- o Cooler temperature or temperature blank was noncompliant and/or sample custody problems.
- p RPD between two columns was high (GC only).
- q MS/MSD recovery was not within control limits.
- s Surrogate recovery was not within control limits.
- t Presumed contamination from trip blank.
- v Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.
- w LCS/LCSD RPD was high.
- y Chemical recovery was not within control limits (Radiochemistry only).

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all analytes.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all analytes.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all analytes.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 20.0% for all analytes.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

No field blanks were identified in this SDG.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

Samples ERH1908(RHSF) and ERH1910(RHSF) were identified as field duplicates. No results were detected in any of the samples.

X. Target Analyte Quantitation

All target analyte quantitations met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XI. Target Analyte Identification

All target analyte identifications met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected or recommended for exclusion in this SDG.

**Red Hill Bulk Storage Facility, CTO 18F0126
Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary -
SDG B21111298**

No Sample Data Qualified in this SDG

**Red Hill Bulk Storage Facility, CTO 18F0126
Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data
Qualification Summary - SDG B21111298**

No Sample Data Qualified in this SDG

**Red Hill Bulk Storage Facility, CTO 18F0126
Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification
Summary - SDG B21111298**

No Sample Data Qualified in this SDG

LDC #: 53055A8

VALIDATION COMPLETENESS WORKSHEET

SDG #: B21111298

Stage 2B/4

Laboratory: Energy Laboratories, Billings, MT

Date: 1/17/22

Page: 1 of 1

Reviewer: [Signature]2nd Reviewer: [Signature]**METHOD:** GC TPH as Extractables (EPA SW-846 Method 8015C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / Δ	
II.	Initial calibration/ICV	A / Δ	% PSD ≤ 20 ICV ≤ 20
III.	Continuing calibration <i>ending</i>	Δ	CV ≤ 20 / 20
IV.	Laboratory Blanks	Δ	
V.	Field blanks	N	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	Δ	MS only
VIII.	Laboratory control samples	Δ	res 10
IX.	Field duplicates	ND	D = 6, 7
X.	Target analyte quantitation	Δ	Not reviewed for Stage 2B validation.
XI.	Target analyte identification	Δ	Not reviewed for Stage 2B validation.
XII.	Overall assessment of data	Δ	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

SB = Source blank
OTHER:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	ERH1893(RHMMW01R)**	B21111298-001**	Water	11/10/21
2	ERH1896(RHMMW02)**	B21111298-002**	Water	11/10/21
3	ERH1899(RHMMW03)**	B21111298-003**	Water	11/10/21
4	ERH1902(RHMMW05)	B21111298-004	Water	11/10/21
5	ERH1905(RHM2254-01)	B21111298-005	Water	11/10/21
6	ERH1908(RHSF) <i>D</i>	B21111298-006	Water	11/10/21
7	ERH1910(RHSF) <i>D</i>	B21111298-007	Water	11/10/21
8 ⁺	ERH1916(Post-Chlorination)	B21111298-008	Water	11/10/21
9	ERH1893(RHMMW01R)(SGCU)**	B21111298-001(SGCU)**	Water	11/10/21
10	ERH1896(RHMMW02)(SGCU)**	B21111298-002(SGCU)**	Water	11/10/21
11	ERH1899(RHMMW03)(SGCU)**	B21111298-003(SGCU)**	Water	11/10/21
12	ERH1902(RHMMW05)(SGCU)	B21111298-004(SGCU)	Water	11/10/21
13	ERH1905(RHM2254-01)(SGCU)	B21111298-005(SGCU)	Water	11/10/21
14	ERH1916(Post-Chlorination)(SGCU)	B21111298-008(SGCU)	Water	11/10/21
15	ERH1893(RHMMW01R)MS	B21111298-001MS	Water	11/10/21
16	ERH1896(RHMMW02)MS	B21111298-002MS	Water	11/10/21
17	ERH1893(RHMMW01R)(SGCU)MS	B21111298-001(SGCU)MS	Water	11/10/21

161348

Method: GC HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was cooler temperature criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent relative standard deviations (%RSD) \leq 20%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of \geq 0.990?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Were the RT windows properly established?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IIb. Initial calibration verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) \leq 20%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
III. Continuing calibration				
Was a continuing calibration analyzed daily?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) \leq 20%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all the retention times within the acceptance windows?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IV. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a laboratory blank analyzed for each matrix and concentration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the laboratory blanks?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
V. Field Blanks				
Were field blanks identified in this SDG?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were target analytes detected in the field blanks?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
VI. Surrogate spikes				
Were all surrogate percent recovery (%R) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
VII. Matrix spike/Matrix spike duplicates				
Were matrix spike (MS) and matrix spike duplicate (MSD) analyzed in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
VIII. Laboratory control samples				
Was an LCS analyzed per analytical or extraction batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Validation Area	Yes	No	NA	Findings/Comments
IX. Field duplicates				
Were field duplicate pairs identified in this SDG?	/			
Were target analytes detected in the field duplicates?		/		
X. Target analyte quantitation				
Did the laboratory LOQs/RLs meet the QAPP LOQs/RLs?	/			
Were analyte quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
XI. Target analyte identification				
Were the retention times of reported detects within the RT windows?	/			
Were manual integrations reviewed and found acceptable?	/			
Did the laboratory provide before and after integration printouts?	/			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	/			

LDC #: 53055A8

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1

Reviewer: FT

METHOD: GC X HPLC

The calibration factors (CF), average CF, and relative standard deviation (%RSD) were recalculated for compounds identified below using the following calculations:

$CF = A/C$

average CF = sum of the CF/number of standards

$\%RSD = 100 * (S/X)$

Where:

A = Area of compound

C = Concentration of compound

S = Standard deviation of calibration factors

X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported 5000ng	Recalculated 5000ng	Reported Average CF (Initial)	Recalculated Average CF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	2/18/2021	DRO Range	28746	28746	28542.4	28542.4	4.5	4.5

LDC #: 53055 AX

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
 Reviewer: FT

METHOD: GC _____ HPLC _____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the target analytes identified below using the following calculation:

% Difference = $100 * (\text{ave. CF} - \text{CF}) / \text{ave. CF}$

Where: ave. CF = initial calibration average CF
 CF = continuing calibration CF
 A = Area of target analyte
 C = Concentration of target analyte

#	Standard ID	Calibration Date	Target Analyte	Average CF(Ical)/ CCV Conc.	Reported	Recalculated	Reported	Recalculated
					CF/ Conc. CCV	CF/ Conc. CCV	%R	%D
1	ceV 1116HP506r	11/16/21 1244	DRO (C10-C24)	15	15	15.13569	101	101
2	ceV ceV-1116HP537r	11/17/21 11821	↓	15	15	15.0	100	100
3	ceV ceV-1118HP507r	11/18/21 1330	↓	15	15	15.22614	102	102
4	ceV -1118HP532r	11/19/21 0723	↓	15	16	15.5684	104	104

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

METHOD: GC HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #2

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
			0.114739			
o-Terphenyl		0.1924	60.0	60	60	0
n-Triacontane		0.0962	90.0	90	90	0
			0.0865			

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

	Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound
A	Chlorobenzene (CBZ)	G	Octacosane	M	Benzo(e)Pyrene	S	1-Chloro-3-Nitrobenzene	Y	Tetrachloro-m- xylene
B	4-Bromofluorobenzene (BFB)	H	Ortho-Terphenyl	N	Terphenyl-D14	T	3,4-Dinitrotoluene	Z	2-Bromonaphthalene
C	a,a,a-Trifluorotoluene	I	Fluorobenzene (FBZ)	O	Decachlorobiphenyl (DCB)	U	Triphenyltin	AA	Chloro-octadecane
D	Bromochlorobenene	J	n-Triacontane	P	1-methylnaphthalene	V	Tri-n-propyltin	BB	2,4-Dichlorophenylacetic acid
E	1,4-Dichlorobutane	K	Hexacosane	Q	Dichlorophenyl Acetic Acid (DCAA)	W	Tributyl Phosphate	CC	2,5-Dibromotoluene
F	1,4-Difluorobenzene (DFB)	L	Bromobenzene	R	4-Nitrophenol	X	Triphenyl Phosphate		

LDC #: 53055 AB

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: FT

METHOD: GC HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the target analytes identified below using the following calculation:

$\% \text{Recovery} = 100 * (\text{SSC}/\text{SA})$

$\text{RPD} = ((\text{SSCLCS} - \text{SSCLCSD}) * 2) / (\text{SSCLCS} + \text{SSCLCSD}) * 100$

Where SSC = Spiked sample concentration

LCS = Laboratory Control Sample

SA = Spike added

LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples: ves 10 - 161348

Compound	Spike Added (mg/L)		Spike Sample Concentration (mg/L)		LCS		LCSD		LCS/LCSD	
	LCS	LCSD	LCS	LCSD	Percent Recovery		Percent Recovery		RPD	
					Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
DRO (C10-C24)	15	15	12	13	81		84		3.4	

Comments: _____

LDC #: 53055A8

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
 Reviewer: FT

METHOD: GC HPLC

The concentration of the sample was calculated for the target analyte identified below using the following calculation:

$$\text{Concentration} = \frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$$

Example:

Sample ID. #1 : DRO (C10 to C24)

- A= Area or height of the target analyte to be measured
- Fv= Final Volume of extract
- Df= Dilution Factor
- RF= Average response factor of the target analyte
In the initial calibration
- Vs= Initial volume of the sample
- Ws= Initial weight of the sample
- %S= Percent Solid

$$\text{Concentration} = \frac{2.481702 \times 10^7 (1)}{31353.19 (900)} = 0.8795 \text{ mg/L}$$

#	Sample ID	Target analyte	Reported Concentrations (mg/L)	Recalculated Results Concentrations (mg/L)	Qualifications
	#1	DRO C10 to C24	0.88	0.8795	

Comments: _____

**Red Hill Bulk Storage Facility, CTO 18F0126 - SDG B2111298
LDC 53055**

AECOM

EPA_NO	LAB_ID	DF	ANALYTE	COLL_DATE	ANAL_DATE	QCLev	RESULT	UNITS	LAB_Q	LOQ	LOD	REV	Q_C
METHOD: 8015C													
ERH1893	B21111298-1		C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	11/10/2021	11/18/2021 10:48:00 PM	4	0.11	MG/L	J	0.33	0.13	J	
ERH1893	B21111298-1		C10-C24 DIESEL RANGE ORGANICS	11/10/2021	11/17/2021 4:20:00 PM	4	0.88	MG/L		0.33	0.17		
ERH1893	B21111298-1		C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	11/10/2021	11/18/2021 10:48:00 PM	4		MG/L	U	0.33	0.17	U	
ERH1893	B21111298-1		C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/10/2021	11/17/2021 4:20:00 PM	4	0.71	MG/L		0.33	0.17		
ERH1893	B21111298-1		EXTRACTABLE PETROLEUM HYDROCARBONS	11/10/2021	11/17/2021 4:20:00 PM	4	1.7	MG/L		0.33	0.17		
ERH1893	B21111298-1		TOTAL EXTRACTABLE HYDROCARBONS SILICA GEL CLEAN U	11/10/2021	11/18/2021 10:48:00 PM	4	0.12	MG/L	J	0.33	0.13	J	
ERH1896	B21111298-1		C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	11/10/2021	11/19/2021 12:57:00 AM	4	0.67	MG/L		0.30	0.12		
ERH1896	B21111298-1		C10-C24 DIESEL RANGE ORGANICS	11/10/2021	11/17/2021 6:29:00 PM	4	2.4	MG/L		0.30	0.14		
ERH1896	B21111298-1		C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	11/10/2021	11/19/2021 12:57:00 AM	4	0.13	MG/L	J	0.30	0.14	J	
ERH1896	B21111298-1		C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/10/2021	11/17/2021 6:29:00 PM	4	0.54	MG/L		0.30	0.14		
ERH1896	B21111298-1		EXTRACTABLE PETROLEUM HYDROCARBONS	11/10/2021	11/17/2021 6:29:00 PM	4	3.2	MG/L		0.30	0.14		
ERH1896	B21111298-1		TOTAL EXTRACTABLE HYDROCARBONS SILICA GEL CLEAN U	11/10/2021	11/19/2021 12:57:00 AM	4	0.85	MG/L		0.30	0.12		
ERH1899	B21111298-1		C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	11/10/2021	11/18/2021 6:30:00 PM	4		MG/L	U	0.30	0.12	U	
ERH1899	B21111298-1		C10-C24 DIESEL RANGE ORGANICS	11/10/2021	11/16/2021 8:36:00 PM	4	0.2	MG/L	J	0.30	0.14	J	
ERH1899	B21111298-1		C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	11/10/2021	11/18/2021 6:30:00 PM	4		MG/L	U	0.30	0.14	U	
ERH1899	B21111298-1		C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/10/2021	11/16/2021 8:36:00 PM	4	0.31	MG/L		0.30	0.14		
ERH1899	B21111298-1		EXTRACTABLE PETROLEUM HYDROCARBONS	11/10/2021	11/16/2021 8:36:00 PM	4	0.74	MG/L		0.30	0.14		
ERH1899	B21111298-1		TOTAL EXTRACTABLE HYDROCARBONS SILICA GEL CLEAN U	11/10/2021	11/18/2021 6:30:00 PM	4	0.04	MG/L	J	0.30	0.12	J	
ERH1902	B21111298-1		C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	11/10/2021	11/18/2021 5:47:00 PM	3		MG/L	U	0.30	0.12	U	
ERH1902	B21111298-1		C10-C24 DIESEL RANGE ORGANICS	11/10/2021	11/16/2021 7:52:00 PM	3	0.086	MG/L	J	0.30	0.15	J	
ERH1902	B21111298-1		C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	11/10/2021	11/18/2021 5:47:00 PM	3		MG/L	U	0.30	0.15	U	
ERH1902	B21111298-1		C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/10/2021	11/16/2021 7:52:00 PM	3	0.11	MG/L	J	0.30	0.15	J	
ERH1902	B21111298-1		EXTRACTABLE PETROLEUM HYDROCARBONS	11/10/2021	11/16/2021 7:52:00 PM	3	0.23	MG/L	J	0.30	0.15	J	
ERH1902	B21111298-1		TOTAL EXTRACTABLE HYDROCARBONS SILICA GEL CLEAN U	11/10/2021	11/18/2021 5:47:00 PM	3		MG/L	U	0.30	0.12	U	
ERH1905	B21111298-1		C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	11/10/2021	11/18/2021 5:04:00 PM	3		MG/L	U	0.30	0.11	U	

EPA_NO	LAB_ID DF	ANALYTE	COLL_DATE	ANAL_DATE	QCLev	RESULT	UNITS	LAB_Q	LOQ	LOD	REV	Q_C
METHOD: 8015C												
ERH1905	B21111298-1	C10-C24 DIESEL RANGE ORGANICS	11/10/2021	11/17/2021 2:55:00 PM	3	0.043	MG/L	J	0.30	0.14	J	
ERH1905	B21111298-1	C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	11/10/2021	11/18/2021 5:04:00 PM	3		MG/L	U	0.30	0.14	U	
ERH1905	B21111298-1	C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/10/2021	11/17/2021 2:55:00 PM	3		MG/L	U	0.30	0.14	U	
ERH1905	B21111298-1	EXTRACTABLE PETROLEUM HYDROCARBONS	11/10/2021	11/17/2021 2:55:00 PM	3	0.13	MG/L	J	0.30	0.14	J	
ERH1905	B21111298-1	TOTAL EXTRACTABLE HYDROCARBONS SILICA GEL CLEAN U	11/10/2021	11/18/2021 5:04:00 PM	3		MG/L	U	0.30	0.11	U	
ERH1908	B21111298-1	C10-C24 DIESEL RANGE ORGANICS	11/10/2021	11/16/2021 4:59:00 PM	3		MG/L	U	0.30	0.14	U	
ERH1908	B21111298-1	C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/10/2021	11/16/2021 4:59:00 PM	3		MG/L	U	0.30	0.14	U	
ERH1908	B21111298-1	EXTRACTABLE PETROLEUM HYDROCARBONS	11/10/2021	11/16/2021 4:59:00 PM	3		MG/L	U	0.30	0.14	U	
ERH1910	B21111298-1	C10-C24 DIESEL RANGE ORGANICS	11/10/2021	11/16/2021 4:16:00 PM	3		MG/L	U	0.30	0.15	U	
ERH1910	B21111298-1	C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/10/2021	11/16/2021 4:16:00 PM	3		MG/L	U	0.30	0.15	U	
ERH1910	B21111298-1	EXTRACTABLE PETROLEUM HYDROCARBONS	11/10/2021	11/16/2021 4:16:00 PM	3		MG/L	U	0.30	0.15	U	
ERH1916	B21111298-1	C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	11/10/2021	11/19/2021 8:55:00 PM	3		MG/L	U	0.30	0.11	U	
ERH1916	B21111298-1	C10-C24 DIESEL RANGE ORGANICS	11/10/2021	11/16/2021 6:25:00 PM	3	0.045	MG/L	J	0.30	0.14	J	
ERH1916	B21111298-1	C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	11/10/2021	11/19/2021 8:55:00 PM	3		MG/L	U	0.30	0.14	U	
ERH1916	B21111298-1	C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/10/2021	11/16/2021 6:25:00 PM	3	0.12	MG/L	J	0.30	0.14	J	
ERH1916	B21111298-1	EXTRACTABLE PETROLEUM HYDROCARBONS	11/10/2021	11/16/2021 6:25:00 PM	3	0.22	MG/L	J	0.30	0.14	J	
ERH1916	B21111298-1	TOTAL EXTRACTABLE HYDROCARBONS SILICA GEL CLEAN U	11/10/2021	11/19/2021 8:55:00 PM	3		MG/L	U	0.30	0.11	U	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Red Hill Bulk Storage Facility, CTO 18F0126

LDC Report Date: March 28, 2022

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 2B

Laboratory: Energy Laboratories, Billings, MT

Sample Delivery Group (SDG): B21111928

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
ERH1919(RHMW01R)	B21111928-001	Water	11/17/21
ERH1922(RHMW02)	B21111928-002	Water	11/17/21
ERH1925(RHMW03)	B21111928-003	Water	11/17/21
ERH1928(RHMW05)	B21111928-004	Water	11/17/21
ERH1931(RHMW2254-01)	B21111928-005	Water	11/17/21
ERH1934(RHSF)	B21111928-006	Water	11/17/21
ERH1934(RHSF)RE	B21111928-006RE	Water	11/17/21
ERH1936(RHSF)	B21111928-007	Water	11/17/21
ERH1936(RHSF)RE	B21111928-007RE	Water	11/17/21
ERH1938(Post-chlorination)	B21111928-008	Water	11/17/21
ERH1938(Post-chlorination)RE	B21111928-008RE	Water	11/17/21
ERH1919(RHMW01R)(SGCU)	B21111928-001(SGCU)	Water	11/17/21
ERH1922(RHMW02)(SGCU)	B21111928-002(SGCU)	Water	11/17/21
ERH1925(RHMW03)(SGCU)	B21111928-003(SGCU)	Water	11/17/21
ERH1928(RHMW05)(SGCU)	B21111928-004(SGCU)	Water	11/17/21
ERH1931(RHMW2254-01)(SGCU)	B21111928-005(SGCU)	Water	11/17/21
ERH1934(RHSF)(SGCU)	B21111928-006(SGCU)	Water	11/17/21
ERH1936(RHSF)(SGCU)	B21111928-007(SGCU)	Water	11/17/21
ERH1938(Post-chlorination)(SGCU)	B21111928-008(SGCU)	Water	11/17/21
ERH1938(Post-chlorination)(SGCU)RE	B21111928-008(SGCU)RE	Water	11/17/21
ERH1925(RHMW03)MS	B21111928-003MS	Water	11/17/21
ERH1928(RHMW05)MS	B21111928-004MS	Water	11/17/21
ERH1925(RHMW03)(SGCU)MS	B21111928-003(SGCU)MS	Water	11/17/21
ERH1928(RHMW05)(SGCU)MS	B21111928-004(SGCU)MS	Water	11/17/21

Samples appended with "SGCU" underwent Silica Gel cleanup

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Work Plan/Scope of Work, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 02, January 2017), the Sampling and Analysis Plan, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 01, April 2017), the Sampling and Analysis Plan, Addendum 01, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 00, September 2017), the Sampling and Analysis Plan, Addendum 03, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 00, June 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3 (2019), the DoD General Validation Guidelines (November 2019), and the U.S. Department of Defense (DoD) Data Validation Guidelines Module 4: Data Validation Procedure for Organic Analysis by GC (March 2021). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Total Petroleum Hydrocarbons (TPH) as Extractables by Environmental Protection Agency (EPA) SW 846 Method 8015C

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J+ (Estimated, High Bias): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.
- J- (Estimated, Low Bias): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.
- J (Estimated, Bias Indeterminate): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.
- U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The analyte was not detected and the associated numerical value is approximate.
- X (Exclusion of data recommended): The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Exclusion of the data is recommended.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

- a ICP Serial Dilution %D was not within control limits.
- b Presumed contamination from preparation (method blank).
- c Calibration %RSD, r, r^2 , %D or %R was noncompliant.
- d The analysis with this flag should not be used because another more technically sound analysis is available.
- e MS/MSD or Duplicate RPD was high.
- f Presumed contamination from FB or ER.
- g ICP ICS results were unsatisfactory.
- h Holding times were exceeded.
- i Internal standard performance was unsatisfactory.
- k Estimated Maximum Possible Concentration (HRGC/HRMS only)
- l LCS/LCSD %R was not within control limits.
- m Result exceeded the calibration range.
- o Cooler temperature or temperature blank was noncompliant and/or sample custody problems.
- p RPD between two columns was high (GC only).
- q MS/MSD recovery was not within control limits.
- s Surrogate recovery was not within control limits.
- t Presumed contamination from trip blank.
- v Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.
- w LCS/LCSD RPD was high.
- y Chemical recovery was not within control limits (Radiochemistry only).

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all analytes.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all analytes.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all analytes.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 20.0% for all analytes.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

No field blanks were identified in this SDG.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

Samples ERH1934(RHSF) and ERH1936(RHSF), ERH1934(RHSF)RE and ERH1936(RHSF)RE, and ERH1934(RHSF)(SGCU) and ERH1936(RHSF)(SGCU), were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/L)		RPD (Limits)	Flag	A or P
	ERH1934(RHSF)	ERH1936(RHSF)			
Diesel range organics (C10 to C24)	0.21J	0.040J	136 (≤50)	-	-
Oil range hydrocarbons (C24 to C40)	0.39	0.23J	52 (≤50)	-	-
Total extractable hydrocarbons	0.67	0.33	68 (≤50)	-	-

X. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XI. Target Analyte Identification

Raw data were not reviewed for Stage 2B validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected or recommended for exclusion in this SDG.

**Red Hill Bulk Storage Facility, CTO 18F0126
Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary -
SDG B21111928**

No Sample Data Qualified in this SDG

**Red Hill Bulk Storage Facility, CTO 18F0126
Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data
Qualification Summary - SDG B21111928**

No Sample Data Qualified in this SDG

**Red Hill Bulk Storage Facility, CTO 18F0126
Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification
Summary - SDG B21111928**

No Sample Data Qualified in this SDG

LDC #: 53055B8

VALIDATION COMPLETENESS WORKSHEET

SDG #: B21111928

Stage 2B

Laboratory: Energy Laboratories, Billings, MT

Date: 11/17/22

Page: 1 of 2

Reviewer: [Signature]2nd Reviewer: [Signature]**METHOD:** GC TPH as Extractables (EPA SW-846 Method 8015C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A Δ	
II.	Initial calibration/ICV	Δ/Δ	% PSD ≤ 20 ICV ≤ 20
III.	Continuing calibration <i>ending</i>	Δ	CW ≤ 20 / 20
IV.	Laboratory Blanks	Δ	
V.	Field blanks	N	
VI.	Surrogate spikes	Δ	
VII.	Matrix spike/Matrix spike duplicates	Δ	MS only
VIII.	Laboratory control samples	A	100 ID
IX.	Field duplicates	SW	D = 6, 8 * 7, 9 * 17, 18
X.	Target analyte quantitation	N	
XI.	Target analyte identification	N	
XII.	Overall assessment of data	SW	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

SB = Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1 [†]	ERH1919(RHMMW01R)	B21111928-001	Water	11/17/21
2 [†]	ERH1922(RHMMW02)	B21111928-002	Water	11/17/21
3 [†]	ERH1925(RHMMW03)	B21111928-003	Water	11/17/21
4 [†]	ERH1928(RHMMW05)	B21111928-004	Water	11/17/21
5 [†]	ERH1931(RHMMW2254-01)	B21111928-005	Water	11/17/21
6 [†]	ERH1934(RHSF) D	B21111928-006	Water	11/17/21
7 ²	ERH1934(RHSF)RE D ₁	B21111928-006RE	Water	11/17/21
8 ¹	ERH1936(RHSF) D ₁	B21111928-007	Water	11/17/21
9 ²	ERH1936(RHSF)RE D ₁	B21111928-007RE	Water	11/17/21
10 ¹	ERH1938(Post-chlorination)	B21111928-008	Water	11/17/21
11 ²	ERH1938(Post-chlorination)RE	B21111928-008RE	Water	11/17/21
12	ERH1919(RHMMW01R)(SGCU)	B21111928-001(SGCU)	Water	11/17/21
13	ERH1922(RHMMW02)(SGCU)	B21111928-002(SGCU)	Water	11/17/21
14	ERH1925(RHMMW03)(SGCU)	B21111928-003(SGCU)	Water	11/17/21
15	ERH1928(RHMMW05)(SGCU)	B21111928-004(SGCU)	Water	11/17/21
16	ERH1931(RHMMW2254-01)(SGCU)	B21111928-005(SGCU)	Water	11/17/21
17	ERH1934(RHSF)(SGCU) D ₂	B21111928-006(SGCU)	Water	11/17/21

LDC #: 53055B8

VALIDATION COMPLETENESS WORKSHEET

Date: 11/17/22

SDG #: B21111928

Stage 2B

Page: 2 of 2

Laboratory: Energy Laboratories, Billings, MT

Reviewer: [Signature]

2nd Reviewer: [Signature]

METHOD: GC TPH as Extractables (EPA SW-846 Method 8015C)

	Client ID	Lab ID	Matrix	Date
18	ERH1936(RHSF)(SGCU) <i>D₂</i>	B21111928-007(SGCU)	Water	11/17/21
19	ERH1938(Post-chlorination)(SGCU)	B21111928-008(SGCU)	Water	11/17/21
20	ERH1938(Post-chlorination)(SGCU) RE	B21111928-008(SGCU) RE	Water	11/17/21
21	ERH1925(RHMW03)MS ✓	B21111928-003MS	Water	11/17/21
22	ERH1928(RHMW05)MS ✓	B21111928-004MS	Water	11/17/21
23	ERH1925(RHMW03)(SGCU)MS	B21111928-003(SGCU)MS	Water	11/17/21
24	ERH1928(RHMW05)(SGCU)MS	B21111928-004(SGCU)MS	Water	11/17/21
25				
26				
27				

Notes:

1	161631	(11/24/21)				
2	161809	(12/3/21)				

VALIDATION FINDINGS WORKSHEET
Field Duplicates

METHOD: GC (EPA Method 8015C)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (mg/L)		RPD (≤ 50 %)	QUAL
	6	8		
1	0.21 J	0.040 J	136	/
2	0.39	0.23 J	52	
3	0.67	0.33	68	

Compound	Concentration ()		RPD (≤ %)	QUAL
1 = Diesel Range Organics (C10 to C24)				
2 = Oil Range Hydrocarbons (C24 to C40)				
3 = Total Extractable Hydrocarbons				

Compound	Concentration ()		RPD (≤ %)	QUAL

Compound	Concentration ()		RPD (≤ %)	QUAL

**Red Hill Bulk Storage Facility, CTO 18F0126 - SDG B21111928
LDC 53055**

AECOM

EPA_NO	LAB_ID	DF	ANALYTE	COLL_DATE	ANAL_DATE	QCLev	RESULT	UNITS	LAB_Q	LOQ	LOD	REV	Q_C
METHOD: 8015C													
ERH1919	B21111928-1		C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	11/17/2021	11/30/2021 2:41:00 AM	3	0.1	MG/L	J	0.30	0.12	J	
ERH1919	B21111928-1		C10-C24 DIESEL RANGE ORGANICS	11/17/2021	11/27/2021 3:43:00 PM	3	0.53	MG/L		0.30	0.15		
ERH1919	B21111928-1		C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	11/17/2021	11/30/2021 2:41:00 AM	3		MG/L	U	0.30	0.15	U	
ERH1919	B21111928-1		C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/17/2021	11/27/2021 3:43:00 PM	3	0.2	MG/L	J	0.30	0.15	J	
ERH1919	B21111928-1		EXTRACTABLE PETROLEUM HYDROCARBONS	11/17/2021	11/27/2021 3:43:00 PM	3	0.81	MG/L		0.30	0.15		
ERH1919	B21111928-1		TOTAL EXTRACTABLE HYDROCARBONS SILICA GEL CLEAN U	11/17/2021	11/30/2021 2:41:00 AM	3	0.11	MG/L	J	0.30	0.12	J	
ERH1922	B21111928-1		C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	11/17/2021	11/30/2021 3:24:00 AM	3	0.52	MG/L		0.30	0.12		
ERH1922	B21111928-1		C10-C24 DIESEL RANGE ORGANICS	11/17/2021	11/27/2021 5:51:00 PM	3	2.5	MG/L		0.30	0.15		
ERH1922	B21111928-1		C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	11/17/2021	11/30/2021 3:24:00 AM	3		MG/L	U	0.30	0.15	U	
ERH1922	B21111928-1		C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/17/2021	11/27/2021 5:51:00 PM	3	0.33	MG/L		0.30	0.15		
ERH1922	B21111928-1		EXTRACTABLE PETROLEUM HYDROCARBONS	11/17/2021	11/27/2021 5:51:00 PM	3	3	MG/L		0.30	0.15		
ERH1922	B21111928-1		TOTAL EXTRACTABLE HYDROCARBONS SILICA GEL CLEAN U	11/17/2021	11/30/2021 3:24:00 AM	3	0.54	MG/L		0.30	0.12		
ERH1925	B21111928-1		C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	11/17/2021	11/29/2021 11:50:00 PM	3		MG/L	U	0.30	0.12	U	
ERH1925	B21111928-1		C10-C24 DIESEL RANGE ORGANICS	11/17/2021	11/29/2021 1:50:00 PM	3	0.12	MG/L	J	0.30	0.15	J	
ERH1925	B21111928-1		C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	11/17/2021	11/29/2021 11:50:00 PM	3		MG/L	U	0.30	0.15	U	
ERH1925	B21111928-1		C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/17/2021	11/29/2021 1:50:00 PM	3	0.35	MG/L		0.30	0.15		
ERH1925	B21111928-1		EXTRACTABLE PETROLEUM HYDROCARBONS	11/17/2021	11/29/2021 1:50:00 PM	3	0.55	MG/L		0.30	0.15		
ERH1925	B21111928-1		TOTAL EXTRACTABLE HYDROCARBONS SILICA GEL CLEAN U	11/17/2021	11/29/2021 11:50:00 PM	3	0.063	MG/L	J	0.30	0.12	J	
ERH1928	B21111928-1		C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	11/17/2021	11/30/2021 1:16:00 AM	3		MG/L	U	0.30	0.12	U	
ERH1928	B21111928-1		C10-C24 DIESEL RANGE ORGANICS	11/17/2021	11/27/2021 12:11:00 PM	3	0.081	MG/L	J	0.30	0.14	J	
ERH1928	B21111928-1		C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	11/17/2021	11/30/2021 1:16:00 AM	3		MG/L	U	0.30	0.14	U	
ERH1928	B21111928-1		C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/17/2021	11/27/2021 12:11:00 PM	3	0.17	MG/L	J	0.30	0.14	J	
ERH1928	B21111928-1		EXTRACTABLE PETROLEUM HYDROCARBONS	11/17/2021	11/27/2021 12:11:00 PM	3	0.35	MG/L		0.30	0.14		
ERH1928	B21111928-1		TOTAL EXTRACTABLE HYDROCARBONS SILICA GEL CLEAN U	11/17/2021	11/30/2021 1:16:00 AM	3		MG/L	U	0.30	0.12	U	
ERH1931	B21111928-1		C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	11/17/2021	11/29/2021 10:24:00 PM	3		MG/L	U	0.30	0.12	U	

EPA_NO	LAB_ID DF	ANALYTE	COLL_DATE	ANAL_DATE	QCLev	RESULT	UNITS	LAB_Q	LOQ	LOD	REV	Q_C
METHOD: 8015C												
ERH1931	B21111928-1	C10-C24 DIESEL RANGE ORGANICS	11/17/2021	11/24/2021 4:01:00 PM	3	0.087	MG/L	J	0.30	0.14	J	
ERH1931	B21111928-1	C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	11/17/2021	11/29/2021 10:24:00 PM	3		MG/L	U	0.30	0.14	U	
ERH1931	B21111928-1	C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/17/2021	11/24/2021 4:01:00 PM	3	0.37	MG/L		0.30	0.14		
ERH1931	B21111928-1	EXTRACTABLE PETROLEUM HYDROCARBONS	11/17/2021	11/24/2021 4:01:00 PM	3	0.54	MG/L		0.30	0.14		
ERH1931	B21111928-1	TOTAL EXTRACTABLE HYDROCARBONS SILICA GEL CLEAN U	11/17/2021	11/29/2021 10:24:00 PM	3		MG/L	U	0.30	0.12	U	
ERH1934	B21111928-1	C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	11/17/2021	11/29/2021 11:07:00 PM	3		MG/L	U	0.30	0.12	U	
ERH1934	B21111928-1	C10-C24 DIESEL RANGE ORGANICS	11/17/2021	11/24/2021 1:53:00 PM	3	0.21	MG/L	J	0.30	0.14	J	
ERH1934	B21111928-1	C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	11/17/2021	11/29/2021 11:07:00 PM	3		MG/L	U	0.30	0.14	U	
ERH1934	B21111928-1	C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/17/2021	11/24/2021 1:53:00 PM	3	0.39	MG/L		0.30	0.14		
ERH1934	B21111928-1	EXTRACTABLE PETROLEUM HYDROCARBONS	11/17/2021	11/24/2021 1:53:00 PM	3	0.67	MG/L		0.30	0.14		
ERH1934	B21111928-1	TOTAL EXTRACTABLE HYDROCARBONS SILICA GEL CLEAN U	11/17/2021	11/29/2021 11:07:00 PM	3		MG/L	U	0.30	0.12	U	
ERH1934	B21111928-1	C10-C24 DIESEL RANGE ORGANICS	11/17/2021	12/3/2021 10:37:00 AM	3		MG/L	U	0.30	0.15	U	
ERH1934	B21111928-1	C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/17/2021	12/3/2021 10:37:00 AM	3		MG/L	U	0.30	0.15	U	
ERH1934	B21111928-1	EXTRACTABLE PETROLEUM HYDROCARBONS	11/17/2021	12/3/2021 10:37:00 AM	3		MG/L	U	0.30	0.15	U	
ERH1936	B21111928-1	C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	11/17/2021	11/29/2021 6:07:00 PM	3		MG/L	U	0.30	0.11	U	
ERH1936	B21111928-1	C10-C24 DIESEL RANGE ORGANICS	11/17/2021	11/24/2021 2:36:00 PM	3	0.04	MG/L	J	0.30	0.14	J	
ERH1936	B21111928-1	C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	11/17/2021	11/29/2021 6:07:00 PM	3		MG/L	U	0.30	0.14	U	
ERH1936	B21111928-1	C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/17/2021	11/24/2021 2:36:00 PM	3	0.23	MG/L	J	0.30	0.14	J	
ERH1936	B21111928-1	EXTRACTABLE PETROLEUM HYDROCARBONS	11/17/2021	11/24/2021 2:36:00 PM	3	0.33	MG/L		0.30	0.14		
ERH1936	B21111928-1	TOTAL EXTRACTABLE HYDROCARBONS SILICA GEL CLEAN U	11/17/2021	11/29/2021 6:07:00 PM	3		MG/L	U	0.30	0.11	U	
ERH1936	B21111928-1	C10-C24 DIESEL RANGE ORGANICS	11/17/2021	12/3/2021 9:54:00 AM	3		MG/L	U	0.30	0.15	U	
ERH1936	B21111928-1	C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/17/2021	12/3/2021 9:54:00 AM	3		MG/L	U	0.30	0.15	U	
ERH1936	B21111928-1	EXTRACTABLE PETROLEUM HYDROCARBONS	11/17/2021	12/3/2021 9:54:00 AM	3		MG/L	U	0.30	0.15	U	
ERH1938	B21111928-1	C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	11/17/2021	11/30/2021 1:24:00 PM	3		MG/L	U	0.30	0.12	U	
ERH1938	B21111928-1	C10-C24 DIESEL RANGE ORGANICS	11/17/2021	11/24/2021 3:18:00 PM	3	0.26	MG/L	J	0.30	0.14	J	
ERH1938	B21111928-1	C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	11/17/2021	11/30/2021 1:24:00 PM	3		MG/L	U	0.30	0.14	U	
ERH1938	B21111928-1	C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/17/2021	11/24/2021 3:18:00 PM	3	0.53	MG/L		0.30	0.14		

EPA_NO	LAB_ID DF	ANALYTE	COLL_DATE	ANAL_DATE	QCLev	RESULT	UNITS	LAB_Q	LOQ	LOD	REV	Q_C
METHOD: 8015C												
ERH1938	B21111928-1	EXTRACTABLE PETROLEUM HYDROCARBONS	11/17/2021	11/24/2021 3:18:00 PM	3	0.88	MG/L		0.30	0.14		
ERH1938	B21111928-1	TOTAL EXTRACTABLE HYDROCARBONS SILICA GEL CLEAN U	11/17/2021	11/30/2021 1:24:00 PM	3		MG/L	U	0.30	0.12	U	
ERH1938	B21111928-1	C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	11/17/2021	12/7/2021 6:18:00 PM	3		MG/L	U	0.30	0.12	U	
ERH1938	B21111928-1	C10-C24 DIESEL RANGE ORGANICS	11/17/2021	12/3/2021 12:03:00 PM	3	0.064	MG/L	J	0.30	0.15	J	
ERH1938	B21111928-1	C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	11/17/2021	12/7/2021 6:18:00 PM	3		MG/L	U	0.30	0.15	U	
ERH1938	B21111928-1	C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/17/2021	12/3/2021 12:03:00 PM	3		MG/L	U	0.30	0.15	U	
ERH1938	B21111928-1	EXTRACTABLE PETROLEUM HYDROCARBONS	11/17/2021	12/3/2021 12:03:00 PM	3	0.13	MG/L	J	0.30	0.15	J	
ERH1938	B21111928-1	TOTAL EXTRACTABLE HYDROCARBONS SILICA GEL CLEAN U	11/17/2021	12/7/2021 6:18:00 PM	3		MG/L	U	0.30	0.12	U	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Red Hill Bulk Storage Facility, CTO 18F0126

LDC Report Date: March 28, 2022

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 2B

Laboratory: Energy Laboratories, Billings, MT

Sample Delivery Group (SDG): B21112212

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
ERH1948(RHMW05)	B21112212-001	Water	11/24/21
ERH1951(RHMW02)	B21112212-002	Water	11/24/21
ERH1954(RHMW03)	B21112212-003	Water	11/24/21
ERH1957(RHMW01R)	B21112212-004	Water	11/24/21
ERH1960(RHMW2254-01)	B21112212-005	Water	11/24/21
ERH1963(RHSF Pre-Chlorination)	B21112212-006	Water	11/24/21
ERH1965(RHSF Pre-Chlorination)	B21112212-007	Water	11/24/21
ERH1966(RHSF Post-Chlorination)	B21112212-008	Water	11/24/21
ERH1948(RHMW05)(SGCU)	B21112212-001 (SGCU)	Water	11/24/21
ERH1951(RHMW02)(SGCU)	B21112212-002 (SGCU)	Water	11/24/21
ERH1954(RHMW03)(SGCU)	B21112212-003 (SGCU)	Water	11/24/21
ERH1957(RHMW01R)(SGCU)	B21112212-004 (SGCU)	Water	11/24/21

Samples appended with "SGCU" underwent Silica Gel cleanup

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Work Plan/Scope of Work, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 02, January 2017), the Sampling and Analysis Plan, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 01, April 2017), the Sampling and Analysis Plan, Addendum 01, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 00, September 2017), the Sampling and Analysis Plan, Addendum 03, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 00, June 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3 (2019), the DoD General Validation Guidelines (November 2019), and the U.S. Department of Defense (DoD) Data Validation Guidelines Module 4: Data Validation Procedure for Organic Analysis by GC (March 2021). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Total Petroleum Hydrocarbons (TPH) as Extractables by Environmental Protection Agency (EPA) SW 846 Method 8015C

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J+ (Estimated, High Bias): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.
- J- (Estimated, Low Bias): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.
- J (Estimated, Bias Indeterminate): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.
- U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The analyte was not detected and the associated numerical value is approximate.
- X (Exclusion of data recommended): The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Exclusion of the data is recommended.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Code Reference

- a ICP Serial Dilution %D was not within control limits.
- b Presumed contamination from preparation (method blank).
- c Calibration %RSD, r, r², %D or %R was noncompliant.
- d The analysis with this flag should not be used because another more technically sound analysis is available.
- e MS/MSD or Duplicate RPD was high.
- f Presumed contamination from FB or ER.
- g ICP ICS results were unsatisfactory.
- h Holding times were exceeded.
- i Internal standard performance was unsatisfactory.
- k Estimated Maximum Possible Concentration (HRGC/HRMS only)
- l LCS/LCSD %R was not within control limits.
- m Result exceeded the calibration range.
- o Cooler temperature or temperature blank was noncompliant and/or sample custody problems.
- p RPD between two columns was high (GC only).
- q MS/MSD recovery was not within control limits.
- s Surrogate recovery was not within control limits.
- t Presumed contamination from trip blank.
- v Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.
- w LCS/LCSD RPD was high.
- y Chemical recovery was not within control limits (Radiochemistry only).

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all analytes.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all analytes.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all analytes.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 20.0% for all analytes.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

No field blanks were identified in this SDG.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

Samples ERH1963(RHSF Pre-Chlorination) and ERH1965(RHSF Pre-Chlorination) were identified as field duplicates. No results were detected in any of the samples.

X. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XI. Target Analyte Identification

Raw data were not reviewed for Stage 2B validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected or recommended for exclusion in this SDG.

**Red Hill Bulk Storage Facility, CTO 18F0126
Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary -
SDG B21112212**

No Sample Data Qualified in this SDG

**Red Hill Bulk Storage Facility, CTO 18F0126
Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data
Qualification Summary - SDG B21112212**

No Sample Data Qualified in this SDG

**Red Hill Bulk Storage Facility, CTO 18F0126
Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification
Summary - SDG B21112212**

No Sample Data Qualified in this SDG

LDC #: 53055C8

VALIDATION COMPLETENESS WORKSHEET

SDG #: B21112212

Stage 2B

Laboratory: Energy Laboratories, Billings, MT

Date: 1/17/22

Page: 1 of 1

Reviewer: [Signature]

2nd Reviewer: [Signature]

METHOD: GC TPH as Extractables (EPA SW-846 Method 8015C)

Extra tables

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / Δ	
II.	Initial calibration/ICV	Δ, Δ	% PSD ≤ 20 ICV ≤ 20
III.	Continuing calibration <i>ending</i>	Δ	CV ≤ 20/20
IV.	Laboratory Blanks	Δ	
V.	Field blanks	N	
VI.	Surrogate spikes	Δ	
VII.	Matrix spike/Matrix spike duplicates	N	CS
VIII.	Laboratory control samples	Δ	CS ID
IX.	Field duplicates	ND	D = 6, 7
X.	Target analyte quantitation	N	
XI.	Target analyte identification	N	
XII.	Overall assessment of data	Δ	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	ERH1948(RHMMW05)	B21112212-001	Water	11/24/21
2	ERH1951(RHMMW02)	B21112212-002	Water	11/24/21
3	ERH1954(RHMMW03)	B21112212-003	Water	11/24/21
4	ERH1957(RHMMW01R)	B21112212-004	Water	11/24/21
5	ERH1960(RHMMW2254-01)	B21112212-005	Water	11/24/21
6	ERH1963(RHSF Pre-Chlorination) ✓	B21112212-006	Water	11/24/21
7	ERH1965(RHSF Pre-Chlorination) ✓	B21112212-007	Water	11/24/21
8	ERH1966(RHSF Post-Chlorination)	B21112212-008	Water	11/24/21
9	ERH1948(RHMMW05)(SGCU)	B21112212-001 (SGCU)	Water	11/24/21
10	ERH1951(RHMMW02)(SGCU)	B21112212-002 (SGCU)	Water	11/24/21
11	ERH1954(RHMMW03)(SGCU)	B21112212-003 (SGCU)	Water	11/24/21
12	ERH1957(RHMMW01R)(SGCU)	B21112212-004 (SGCU)	Water	11/24/21
13				
14				

Notes:

161704					

**Red Hill Bulk Storage Facility, CTO 18F0126 - SDG B21112212
LDC 53055**

AECOM

EPA_NO	LAB_ID	DF	ANALYTE	COLL_DATE	ANAL_DATE	QCLev	RESULT	UNITS	LAB_Q	LOQ	LOD	REV	Q_C
METHOD: 8015C													
ERH1948	B21112212-1		C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	11/24/2021	12/2/2021 6:09:00 PM	3		MG/L	U	0.30	0.11	U	
ERH1948	B21112212-1		C10-C24 DIESEL RANGE ORGANICS	11/24/2021	12/1/2021 2:20:00 AM	3	0.078	MG/L	J	0.30	0.14	J	
ERH1948	B21112212-1		C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	11/24/2021	12/2/2021 6:09:00 PM	3		MG/L	U	0.30	0.14	U	
ERH1948	B21112212-1		C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/24/2021	12/1/2021 2:20:00 AM	3	0.15	MG/L	J	0.30	0.14	J	
ERH1951	B21112212-1		C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	11/24/2021	12/2/2021 5:26:00 PM	3	0.63	MG/L		0.30	0.12		
ERH1951	B21112212-1		C10-C24 DIESEL RANGE ORGANICS	11/24/2021	12/1/2021 10:55:00 AM	3	3.1	MG/L		0.30	0.15		
ERH1951	B21112212-1		C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	11/24/2021	12/2/2021 5:26:00 PM	3		MG/L	U	0.30	0.15	U	
ERH1951	B21112212-1		C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/24/2021	12/1/2021 10:55:00 AM	3	0.35	MG/L		0.30	0.15		
ERH1954	B21112212-1		C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	11/24/2021	12/2/2021 4:00:00 PM	3		MG/L	U	0.30	0.12	U	
ERH1954	B21112212-1		C10-C24 DIESEL RANGE ORGANICS	11/24/2021	12/1/2021 12:10:00 AM	3	0.13	MG/L	J	0.30	0.15	J	
ERH1954	B21112212-1		C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	11/24/2021	12/2/2021 4:00:00 PM	3		MG/L	U	0.30	0.15	U	
ERH1954	B21112212-1		C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/24/2021	12/1/2021 12:10:00 AM	3	0.29	MG/L	J	0.30	0.15	J	
ERH1957	B21112212-1		C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	11/24/2021	12/2/2021 3:18:00 PM	3	0.11	MG/L	J	0.30	0.11	J	
ERH1957	B21112212-1		C10-C24 DIESEL RANGE ORGANICS	11/24/2021	11/30/2021 11:27:00 PM	3	0.48	MG/L		0.30	0.14		
ERH1957	B21112212-1		C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	11/24/2021	12/2/2021 3:18:00 PM	3		MG/L	U	0.30	0.14	U	
ERH1957	B21112212-1		C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/24/2021	11/30/2021 11:27:00 PM	3	0.22	MG/L	J	0.30	0.14	J	
ERH1960	B21112212-1		C10-C24 DIESEL RANGE ORGANICS	11/24/2021	11/30/2021 10:00:00 PM	3		MG/L	U	0.30	0.14	U	
ERH1960	B21112212-1		C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/24/2021	11/30/2021 10:00:00 PM	3		MG/L	U	0.30	0.14	U	
ERH1963	B21112212-1		C10-C24 DIESEL RANGE ORGANICS	11/24/2021	11/30/2021 9:17:00 PM	3		MG/L	U	0.30	0.14	U	
ERH1963	B21112212-1		C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/24/2021	11/30/2021 9:17:00 PM	3		MG/L	U	0.30	0.14	U	
ERH1965	B21112212-1		C10-C24 DIESEL RANGE ORGANICS	11/24/2021	11/30/2021 4:14:00 PM	3		MG/L	U	0.30	0.14	U	
ERH1965	B21112212-1		C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/24/2021	11/30/2021 4:14:00 PM	3		MG/L	U	0.30	0.14	U	
ERH1966	B21112212-1		C10-C24 DIESEL RANGE ORGANICS	11/24/2021	11/30/2021 4:57:00 PM	3		MG/L	U	0.30	0.14	U	
ERH1966	B21112212-1		C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE OR	11/24/2021	11/30/2021 4:57:00 PM	3		MG/L	U	0.30	0.14	U	