

LABORATORY DATA CONSULTANTS, INC.

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AECOM October 6, 2022

1001 Bishop Street Suite 1600 Honolulu, HI 96813 ATTN: Ms. Alethea Ramos alethea.ramos@aecom.com

SUBJECT: Red Hill Oily Waste Disposal Facility, CTO 18F0176 - Data Validation

Dear Ms. Ramos,

Enclosed is the final validation report for the fractions listed below. These SDGs were received on June 21, 2022. Attachment 1 is a summary of the samples that were reviewed for the analysis.

LDC Project # 54717:

SDG # Fraction

22C261, 22C287, 22C288, 22C308, 22C309, 22C311, 22C312, 22C313, 22C334, 22C335, 22C336, 22C337, 22C352, 22C355

Wet Chemistry, 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:

- Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021)
- U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3 (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

	1,757 pages-ADV Attachment 1																																
	90/10 2B/4	EDD		LI	DC#	54	717	(AE	ECC	М -	Но	nol	ulu,	HI A	/ Re	d H	iII C	Dily	Wa	ste,	СТ	O 1	8F0	176	5)								
LDC	SDG#	DATE REC'D	(3) DATE DUE		H-E 15C)	SG TPI (801		(35	: II 500 : B)	(45 SIO	00-	Diss (45 SIO	00-																				
Matrix	: Water/Soil		•	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
Α	22C261	06/21/22	07/13/22	1	0	-	-	1	0	1	0	1	0																		igsqcup	Ш	
В	22C287		07/13/22	1	0	-	-	1	0	1	0	1	0																		igsquare	Ш	
С	22C288	06/21/22	07/13/22	1	0	-	-	1	0	1	0	1	0																		igsqcup	Ш	
D	22C308	06/21/22	07/13/22	1	0	-	-	1	0	1	0	1	0																		igsqcup	Ш	
Е	22C309	06/21/22	07/13/22	1	0	-	-	1	0	1	0	1	0																		igsqcup	Ш	
F	22C311	06/21/22	07/13/22	2	0	-	-	1	0	1	0	1	0																		igsqcup	Ш	
G	22C312	06/21/22	07/13/22	1	0	-	-	1	0	1	0	1	0																		Ш	Ш	
Н	22C313	06/21/22	07/13/22	1	0	1	0	1	0	1	0	1	0																		igsqcup	Ш	
ı	22C334	06/21/22	07/13/22	1	0	-	-	1	0	1	0	1	0																		igsqcup	Ш	
J	22C335	06/21/22	07/13/22	1	0	-	-	1	0	1	0	1	0																		igsqcup	Ш	
K	22C336	06/21/22	07/13/22	1	0	-	-	1	0	1	0	1	0																		Ш	Ш	
L	22C337	06/21/22	07/13/22	1	0	1	0	1	0	1	0	1	0																		Ш	Ш	
М	22C352	06/21/22	07/13/22	1	0	1	0	1	0	1	0	1	0																		igsqcup	Ш	
N	22C355	06/21/22	07/13/22	1	0	-	-	-	-	-	-	-	-																		Ш	Ш	
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Total	T/SC			15	0	3	0	13	0	13	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

September 26, 2022

Parameters:

Wet Chemistry

Validation Level:

Stage 2B

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C261

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU084	22C261-01	Water	03/21/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3 (2019), and the DoD General Validation Guidelines (November 2019). 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 methods:

Ferrous Iron by Standard Method 3500-Fe B Silica and Dissolved Silica by Standard Method 4500-SiO2 C

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.
- (Estimated, Bias Indeterminate): The analyte was analyzed for and positively J 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.
- Χ (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.
- (Not Applicable): The non-conformance discovered during data validation NA 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

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

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

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. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

The results for the dissolved sample analysis were greater than the total sample analysis as follows:

	Concentration (mg/L)						
Sample	Total Silica	Dissolved Silica					
HU084	61.1	79.6					

Raw data were not reviewed for Stage 2B validation.

XI. Overall Assessment of Data

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

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Data Qualification Summary - SDG 22C261

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 22C261

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Field Blank Data Qualification Summary - SDG 22C261

No Sample Data Qualified in this SDG

SDG #	t: 54717A6 VALIDAT t: 22C261 atory: EMAX Laboratories, Inc., Torra	S	LETENESS tage 2B	WORKSHEE		Date: 9/92/2 Page: 1 of 1 Reviewer: 41/ Reviewer: 2
METH	IOD: (Analyte) Ferrous Iron (SM3500	-FE B), Silica,	Dissolved Sili	ca (SM4500-SIO	2 C)_	
	amples listed below were reviewed for tion findings worksheets.	each of the fo	ollowing valida	tion areas. Valida	ation findings are	noted in attached
	Validation Area			Con	nments	
I.	Sample receipt/Technical holding times	AIA				
II	Initial calibration	A				
III.	Calibration verification	A				
IV	Laboratory Blanks	A				
V	Field blanks	\mathcal{N}				
VI.	Matrix Spike/Matrix Spike Duplicates	A	From SDE	T# 22C287	(HU092 MS	S/MSD)
VII.	Duplicate sample analysis	A		√	(HU092 DU	
VIII.	Laboratory control samples	A	uslus	ED .		
IX.	Field duplicates	N				
X.	Target Analyte Quantitation	SWA				
XI.	Overall assessment of data	A				
Note:	N = Not provided/applicable R =	= No compounds Rinsate = Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipment b	OTHER:	rce blank
	Client ID			Lab ID	Matrix	Date
1	HU084			22C261-01	Water	03/21/22
2						
3						
4						
5		·		: 		
6				! 		
7						
8						
9						
10						
11						
12						
13						
14						

Notes:

LDC #: 54717AG

VALIDATION FINDINGS WORKSHEET Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: ATV

All circled methods are applicable to each sample.

Sample ID	Parameter
	PH TDS CI F NO3 NO2 SO4 O-PO4 AIK EN NH3 TKN TOC C16+ C1O4 (Fe^{2}) (102) (5102) (102)
· ·	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	PH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO $_3$ NO $_2$ SO $_4$ O-PO $_4$ AIk CN NH $_3$ TKN TOC Cr6+ CIO $_4$
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	DH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	DH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	DH TDS CLE NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	DH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	DH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	DH TDS CLE NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	DH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	DH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	DH TDS CLE NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4

Comments:

VALIDATION FINDINGS WORKSHEETS Target Analyte Quantitation

Page 1 of 1 Reviewer:

METHOD: Inorganics

		T			
Sample ID	Analyte	Total Result	Dissolved Result	Qualification	Det/ND
	1 SiO2	61.1	79.6	Text	
	_				
-					
·······					
		1			

Comments:

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

August 17, 2022

Parameters:

Total Petroleum Hydrocarbons as Extractables

Validation Level:

Stage 2B

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C261

	Laboratory Sample		Collection
Sample Identification	Identification	Matrix	Date
HU084	22C261-01	Water	03/21/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), 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)
- I LCS/LCSD %R was not within control limits.
- m Result exceeded the calibration range.
- 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

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

No field duplicates were identified in this SDG.

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 Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary -**SDG 22C261**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG 22C261

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 22C261

No Sample Data Qualified in this SDG

SDG #	t: 54717A8a VALIDATIO t: 22C261 atory: EMAX Laboratories, Inc., Torrance	S	LETENES tage 2B	SS WORKSHEET	Rev	Date: 4 11 Page: lof /			
/ETH	IOD: GC TPH as Extractables (EPA SW-	-846 Metho	od 8015C)			AICAACI			
	e samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached idation findings worksheets.								
	Validation Area			Comme	ents				
I.	Sample receipt/Technical holding times	AIA							
II.	Initial calibration/ICV	A /A	0/0 ps	0/1cy = 20					
III.	Continuing calibration ending	A		(w = w					
IV.	Laboratory Blanks	Δ							
_V.	Field blanks	N							
VI.	Surrogate spikes	Δ							
VII.	Matrix spike/Matrix spike duplicates	N	e5						
VIII.	Laboratory control samples	4	100 10			710			
IX.	Field duplicates	N							
X.	Target analyte quantitation	N							
XI.	Target analyte identification	N			· · · · · · · · · · · · · · · · · · ·				
XII	Overall assessment of data								
lote:	N = Not provided/applicable R = Rin	o compounds sate eld blank	s detected	D = Duplicate TB = Trip-blank EB = Equipment blank	SB=Source OTHER:	blank			
	Client ID			Lab ID	Matrix	Date			
7	HU084			22C261-01	Water	03/21/22			
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Laboratory Data Consultants, Inc. **Data Validation Report**

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

September 26, 2022

Parameters:

Wet Chemistry

Validation Level:

Stage 4

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C287

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU092	22C287-01	Water	03/22/22
HU092MS	22C287-01MS	Water	03/22/22
HU092MSD	22C287-01MSD	Water	03/22/22
HU092DUP	22C287-01DUP	Water	03/22/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3 (2019), and the DoD General Validation Guidelines (November 2019). 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 methods:

Ferrous Iron by Standard Method 3500-Fe B Silica and Dissolved Silica by Standard Method 4500-SiO2 C

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (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.
- (Estimated, Bias Indeterminate): The analyte was analyzed for and positively J 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.
- Χ (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.
- (Not Applicable): The non-conformance discovered during data validation NA 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

- а ICP Serial Dilution %D was not within control limits.
- Presumed contamination from preparation (method blank). b
- Calibration %RSD, r, r², %D or %R was noncompliant. С
- The analysis with this flag should not be used because another more d technically sound analysis is available.
- MS/MSD or Duplicate RPD was high. е
- f Presumed contamination from FB or ER.
- ICP ICS results were unsatisfactory. g
- h Holding times were exceeded.
- i Internal standard performance was unsatisfactory.
- Estimated Maximum Possible Concentration (HRGC/HRMS only) k
- LCS/LCSD %R was not within control limits. I
- Result exceeded the calibration range. m
- Cooler temperature or temperature blank was noncompliant and/or sample 0 custody problems.
- RPD between two columns was high (GC only). р
- MS/MSD recovery was not within control limits. q
- Surrogate recovery was not within control limits. S
- Presumed contamination from trip blank. t
- Unusual problems found with the data not defined elsewhere. Description of the ν problem can be found in the validation report.
- LCS/LCSD RPD was high. W
- Chemical recovery was not within control limits (Radiochemistry only). У

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

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. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

All target analyte quantitations were acceptable.

XI. Overall Assessment of Data

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

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Data Qualification Summary - SDG 22C287

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 22C287

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Field Blank Data Qualification Summary - SDG 22C287

No Sample Data Qualified in this SDG

SDG	#:54717B6 VALIDA * #:22C287 ratory: EMAX Laboratories, Inc., Torra	5	LETENESS Stage 4	S WORKSHEET		Date: <u>9 22 1</u> Page: <u> </u> of <u> </u> Reviewer: - A TU				
	HOD: (Analyte) Ferrous Iron (SM350		Dissolved Sili	ca (SM4500-SIO2	2nd l	Reviewer:				
	he samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached alidation findings worksheets.									
	Validation Area			Comr	nents					
I.	Sample receipt/Technical holding times	AIA								
11	Initial calibration	A								
III.	Calibration verification	A								
IV	Laboratory Blanks	A								
V	Field blanks	N_								
VI.	Matrix Spike/Matrix Spike Duplicates	A	(213)							
VII.	Duplicate sample analysis	A	4							
VIII.	Laboratory control samples	A	LCS/LCST)						
IX.	Field duplicates	N_								
X.	Target Analyte Quantitation	A	·		···					
_XL	Overall assessment of data	<u> </u>								
Note:	N = Not provided/applicable R	D = No compounds = Rinsate B = Field blank	detected	D = Duplicate TB = Trip blank EB = Equipment bla	OTHER:	rce blank				
	Client ID			Lab ID	Matrix	Date				
1	HU092			22C287-01	Water	03/22/22				
2	HU092MS			22C287-01MS	Water	03/22/22				
3	HU092MSD			22C287-01MSD	Water	03/22/22				
4	HU092DUP			22C287-01DUP	Water	03/22/22				
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
1				1	1					

Notes:

Page 1 of 2

Reviewer: ATL

METHOD: Inorganics	·		<u>, </u>	p
Validation Area	Yes	No	NA	Comments
I. Technical holding times				
Were all technical holding times met?	V			
II. Calibration		,		
Were all instruments calibrated at the	V			
required frequency?				
Were the proper number of standards	V	l		
used?	L_			
Were all initial and continuing calibration	V			
verifications within the QC limits?	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			
Were all initial calibration correlation	1			
coefficients within limits as specifed by the	V			
method?				
Were balance checks performed as			. /	
required?				
III. Blanks				
Was a method blank associated with every	1			
sample in this SDG?				
Was there contamination in the method	-	1		
blanks?				
Was there contamination in the initial and		1		
continuing calibration blanks?				
IV. Matrix Spike/Matrix Spike Duplicates/I	.aborat	ory Dup	olicates	
Were MS/MSD recoveries within the QC				
limits? (If the sample concentration				
exceeded the spike concentration by a	\			
factor of 4, no action was taken.)				
Were the MS/MSD or laboratory duplicate	./			
relative percent differences (RPDs) within	\			
the QC limits?		1		
V. Laboratory Control Samples				
Was a LCS analyzed for each batch in the	1			
SDG?				
Were the LCS recoveries and RPDs (if				
applicable) within QC limits?				
X. Target Analyte Quantitation		·		
Were all reporting limits adjusted to reflect	1		,	
sample dilutions?				
Were all soil samples dry weight corrected?			V	
XI. Overall Assessment of Data			·	~
Was the overall assessment of the data				
found to be acceptable?	*	1	1	

METHOD: Inorganics	r			
Validation Area	Yes	No	NA	Comments
XII. Field Duplicates				
Were field duplicates identifed in this SDG?		V		
Were target analytes detected in the field duplicates?			V	
XIII. Field Blanks				
Were field blanks identified in this SDG?				
Were target analytes detected in the field blanks?			V	

LDC #: 54717BG

VALIDATION FINDINGS WORKSHEET Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: 477/

All circled methods are applicable to each sample.

Sample ID	Parameter
	ph tds ci f no, no, so, o-po, aik cn nh, tkn toc cr6+ cio(Fe ²⁺) (SiO2) (SiO2) (SiO2)
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
00	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	ph TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4 (Fe2+) (SiO2) (SiO2) (SiO2)
177	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	ph TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4

Comments:

LDC #: 54717 BG

Validation Findings Worksheet <u>Initial and Continuing Calibration Calculation Verification</u>

Page:1_	_ of	_1
Reviewe	r: A1	ΓL

Method: Inorganics, Method	See Cover
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The correlation coefficient (r) for the calibration of $\frac{7e^{2+}}{12e^{2+}}$ was recalculated. Calibration date: $\frac{03|24|22}{12e^{2+}}$

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = <u>Found X 100</u>

Where,

Found = concentration of each analyte measured in the analysis of the ICV or CCV solution

True

True = concentration of each analyte in the ICV or CCV source

		FOUND	TRUE	1	Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (mg/L)	Area	r or r ²	r or r ²	(Y/N)
Initial calibration		s1	0.0	0			
		s2	1	0.023	0.99958	0.99979	
		s3	10	0.225			Y
	Fe2t	s4	15	0.332			
		s5	20	0.442			
		s6	25	0.54			
CCV) Calibration verification	Fe2t	15.115	15.000		101	101	Y
CCV∤ Calibration verification	SiO2	14.415	15.000		95	96	Υ
Calibration verification	SiO2 (Dis)	14.968	15,000		100	<u>1</u> 00	Υ

Comments: Heter to Calibration Verification findings worksneet for list of qualifications and associated samples when reported results do not agree within
10.0% of the recalculated results

LDC #: 54717BC

VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Page:_	l_of	
Reviewer:	A	$\overline{\mathbb{N}}$

METHOD: Inorganics,	MethodS	ee cover	
Percent recoveries (%	R) for a labora	itory control samp	ole and a matrix spike sample were recalculated using the following formula:
%R = <u>Found</u> x 100 True	Where,	Found = True = cond	concentration of each analyte <u>measured</u> in the analysis of the sample. For the matrix spike calculation Found = SSR (spiked sample result) - SR (sample result). centration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = |S-D| \times 100$

Where,

S = D = Original sample concentration

(S+D)/2

Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	MG/L True/D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Si 02	15.289	15.00	102	102	Y
2	Matrix spike sample	Fe ²⁺	(SSR-SR) 12.304	15.000	82	82	y .
4	Duplicate sample	Si02	25.968	25.968	0	0	У

Comments:		
	····	

LDC #: 54717BC

VALIDATION FINDINGS WORKSHEET

Sample Calculation Verification

Page:_	l_of_
Reviewer:	ATT

METHOD: Ino	rganics, MethodSee cover	<u> </u>	
Please see qua X N N/A Y N N/A Y N N/A	alifications below for all question Have results been reported a Are results within the calibrate Are all detection limits below	ns answered "N". Not applicable nd calculated correctly? ed range of the instruments? the CRQL?	questions are identified as "N/A".
Compound (ar	nalyte) results for nd verified using the following ed	3102 (Dis)	reported with a positive detect were
Concentration =		Recalculation:	

0.125-0.0013	Y 5	_	24.839
0.0249	, ,		, - ,

#	Sample ID	Analyte	Reported Concentration (MGL)	Calculated Concentration (MA)	Acceptable (Y/N)
	1	Fe 2t	ND	ND	V
		Si07-	25.9	25,968	7
	1	Fe ^{2t} SiOz SiOz Dis	24.8	24.839	<i>\\</i>
				1.82	/
					\

Note:			
		_	

Laboratory Data Consultants, Inc. Data Validation Report

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Project/Site Name:

LDC Report Date: August 17, 2022

Total Petroleum Hydrocarbons as Extractables Parameters:

Validation Level: Stage 4

EMAX Laboratories, Inc., Torrance, CA Laboratory:

Sample Delivery Group (SDG): 22C287

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU092	22C287-01	Water	03/22/22
HU092MS	22C287-01MS	Water	03/22/22
HU092MSD	22C287-01MSD	Water	03/22/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), 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 4 data validation, which is comprised of the quality control (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.
- Χ (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

- ICP Serial Dilution %D was not within control limits. а
- Presumed contamination from preparation (method blank). b
- Calibration %RSD, r, r², %D or %R was noncompliant.
- The analysis with this flag should not be used because another more technically d sound analysis is available.
- MS/MSD or Duplicate RPD was high. е
- f Presumed contamination from FB or ER.
- ICP ICS results were unsatisfactory. g
- h Holding times were exceeded.
- i Internal standard performance was unsatisfactory.
- Estimated Maximum Possible Concentration (HRGC/HRMS only) k
- ı LCS/LCSD %R was not within control limits.
- m Result exceeded the calibration range.
- Cooler temperature or temperature blank was noncompliant and/or sample 0 custody problems.
- RPD between two columns was high (GC only). р
- MS/MSD recovery was not within control limits. q
- s Surrogate recovery was not within control limits.
- t Presumed contamination from trip blank.
- Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.
- LCS/LCSD RPD was high. w
- Chemical recovery was not within control limits (Radiochemistry only). У

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) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) 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

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

All target analyte quantitations met validation criteria.

XI. Target Analyte Identification

All target analyte identifications met validation criteria.

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 Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary -**SDG 22C287**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data **Qualification Summary - SDG 22C287**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 22C287

No Sample Data Qualified in this SDG

SDG abo MET The s	#: 54717B8a VALIDATION #: 22C287 ratory: EMAX Laboratories, Inc., Torrand HOD: GC TPH as Extractables (EPA SW samples listed below were reviewed for eation findings worksheets.	ce, CA V-846 Metho	Stage 4 od 8015C)	SS WORKSHEET idation areas. Validation	Rev 2nd Rev	Date: 8/17/Page: 1_of_/ viewer:viewer:viewer:viewer.
	Validation Area			Comm	ents	
l.	Sample receipt/Technical holding times	4/4			,	
II.	Initial calibration/ICV	Δ Δ	0/0	BD/14=20		
III.	Continuing calibration endury	Δ		es0/161 = n) cw ∈ n	In	
IV.	Laboratory Blanks	Δ				
V.	Field blanks	N				
VI.	Surrogate spikes	Δ				
VII.		Δ				
VIII.		A	us 19			
IX.	Field duplicates	N				
X.	Target analyte quantitation	Δ				
XI.	Target analyte identification	A				
XII	Overall assessment of data	Δ				
lote:	N = Not provided/applicable R = F	No compounds Rinsate Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipment blan	SB=Source OTHER: k	blank
	Client ID			Lab ID	Matrix	Date
1	HU092			22C287-01	Water	03/22/22
2	HU092MS			22C287-01MS	Water	03/22/22
3	HU092MSD		NA. 40. 4	22C287-01MSD	Water	03/22/22
4						
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otes:	, []		- 			
+	MBIKIW					
	i i					

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: FT

Method: GC HPLC

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

LDC #: 547171380

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: FT

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 #: 54717138a

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Page:_	/of/
Reviewer:	
2nd Reviewer:	

METHOD: GC	HPLC

The calibration factors (CF) and relative standard deviation (%RSD) were recalculated using the following calculations:

CF = A/C

Where: A = Area of compound

Average CF = sum of the CF/number of standards

C = Concentration of compound

%RSD = 100 * (S/X)

S = Standard deviation of calibration factors

X = Mean of calibration factors

				Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
#	Standard ID	Calibration Date	Compound	CF (<i>SOU</i> std)	CF (<i>Sひし</i> std)	CF (initial)	CF (intial)	%RSD	%RSD
1	ICAL	8/12/21	Diesel Cho-czy	27380	21380	26318-7	26318.7	9.7	9.7
		, ,							
2									
	•								
3									
4									

Comments:	Refer to	Initial Ca	<u>alibration</u>	findings '	<u>workshee</u>	et for list	of qua	alification	s and a	ssociated	<u>samples</u>	when	<u>reported</u>	results of	do not a	agree w	<u>vithin 1</u>	<u> 10.0% </u>	of the
recalculated	results.																		

LDC #:	54	7/	7 1380	_
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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 * (ave. CF -CF)/ave.CF

Where: ave. CF = initial calibration average CF

CF = continuing calibration CF

A = Area of target analyte

C = Concentration of target analyte

	Standard	Calibration			Reported	Recalculated	Reported	Recalculated
#	ID	Date	Target Analyte	Average CF(Ical)/ CCV Conc.	CF/ Conc. CCV	CF/ Conc. CCV	%D	%D
1	cc/	3/30/22	Diesel cp-Czy	2106	543.98	543-28	٦	9
		1218						
2								
								·
3								
4								

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.

LDC #: <u>5471788</u> METHOD: <u>GC HPLC</u>

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page:_	1	_of_	1
Reviewer:		FT	

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:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Regovery	Percent Difference
				Reported	Recalculated	
bromoberzene		100	85.301	XC	82	0
Hexacosane		25	27.866	M	11/	U

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	М	Benzo(e)Pyrene	S	1-Chloro-3-Nitrobenzene	Υ	Tetrachloro-m- xylene
В	4-Bromofluorobenzene (BFB)	Н	Ortho-Terphenyl	N	Terphenyl-D14	Т	3,4-Dinitrotoluene	z	2-Bromonaphthalene
C,	a,a,a-Trifluorotoluene	_	Fluorobenzene (FBZ)	0	Decachlorobiphenyl (DCB)	U	Tripentyltin	AA	Chloro-octadecane
D	Bromochlorobenene	J	n-Triacontane	Р	1-methylnaphthalene	V	Tri-n-propyltin	ВВ	2,4-Dichlorophenylacetic acid
E	1,4-Dichlorobutane	К	Hexacosane	Q	Dichlorophenyl Acetic Acid (DCAA)	W	Tributyl Phosphate	СС	2,5-Dibromotoluene
F	1,4-Difluorobenzene (DFB)	L	Bromobenzene	R	4-Nitrophenol	X	Triphenyl Phosphate	<u> </u>	

LDC#: 54717/38~

VALIDATION FINDINGS WORKSHEET <u>Matrix Spike/Matrix Spike Duplicates Results Verification</u>

Page	e: <u>1_</u> of_1_
Reviewer:	FT

METHOD: __GC __HPLC

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

%Recovery = 100 * (SSC - SC)/SA

Where

SSC = Spiked sample concentration

MS = Matrix spike

RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100

SC = Sample concentration
SA = Spike added

MSD = Matrix spike duplicate

MS/MSD samples: 2 + 3

	Sp Add	ike led	Sample Conc.	Spike S Concer	Sample ntration (V)		Matrix spike		e Duplicate		MSD
Compound	(W		(mg/r	<u> </u>	V	Percent	Recovery	Percent I	Recovery	RPD	
	MS	MSD		MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
TPH- Diesel Range	5.0	5.6	47	4.92	5.49	9x	98	טוו	เอ	11	1/
1											

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

LDC #: 54717138a

VALIDATION FINDINGS WORKSHEET	Page:_	<u>1_of_1</u>	
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:

%Recovery = 100 * (SSC/SA) RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

SSC = Spiked sample concentration

SA = Spike added

LCS = Laboratory Control Sample

LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples:_

	Sp Add	ike ded	Spike Sample Concentration		LC		LC	SD	LCS/L	CSD
Compound	(mg/		(ung	<u>(기</u>	Percent F	Recovery	Percent Recovery		RPD	
	rcs ,	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
TPH- Diexel Range	5-0	6.0	5-26	5.27	106	106	105	105	O	υ
										<i>/</i>

Comments:		

LDC #: 547/7.88 @

VALIDATION FINDINGS WORKSHEET <u>Sample Calculation Verification</u>

Page:	<u>_1</u> _of	1
Reviewer:	FT	

METHOD: GC __ HPLC

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

Concentration= (A)(Fv)(Df)	Example:		
(RF)(Vs or Ws)(%S/100)			_
	Sample ID. 0らと037 WL	: TPH - Viesel	Rang-e
A= Area or height of the target analyte to be measured Fv= Final Volume of extract			
Df= Dilution Factor	0	13905796	(10)
RF= Average response factor of the target analyte	Concentration =	1) 10-10	
In the initial calibration		26318.69	(ومرس
Vs= Initial volume of the sample		20 7 0.6	(1000)
Ws= Initial weight of the sample			

%S= Percent Solid 5.2036 mg \L

		(0) (08)	<u> </u>	3,20 mg/r					
	#	Sample ID Target analyte Concent		Reported Concentrations (سمع) ل	Recalculated Results Concentrations (mg)	Qualifications			
		Diend Range (LE)	Diexl Range	5.7%	5.2836				
			; 						
L									
- [}				

Comments:	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

September 26, 2022

Parameters:

Wet Chemistry

Validation Level:

Stage 2B

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C288

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU088	22C288-01	Water	03/22/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3 (2019), and the DoD General Validation Guidelines (November 2019). 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 methods:

Ferrous Iron by Standard Method 3500-Fe B Silica and Dissolved Silica by Standard Method 4500-SiO2 C

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

- ICP Serial Dilution %D was not within control limits. а
- Presumed contamination from preparation (method blank). b
- Calibration %RSD, r, r², %D or %R was noncompliant. С
- The analysis with this flag should not be used because another more d technically sound analysis is available.
- MS/MSD or Duplicate RPD was high. е
- f Presumed contamination from FB or ER.
- ICP ICS results were unsatisfactory. g
- Holding times were exceeded. h
- i Internal standard performance was unsatisfactory.
- k Estimated Maximum Possible Concentration (HRGC/HRMS only)
- LCS/LCSD %R was not within control limits. 1
- Result exceeded the calibration range. m
- Cooler temperature or temperature blank was noncompliant and/or sample 0 custody problems.
- RPD between two columns was high (GC only). р
- MS/MSD recovery was not within control limits. q
- Surrogate recovery was not within control limits. S
- t Presumed contamination from trip blank.
- Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.
- LCS/LCSD RPD was high. W
- Chemical recovery was not within control limits (Radiochemistry only). У

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

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. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XI. Overall Assessment of Data

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

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Data Qualification Summary - SDG 22C288

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 22C288

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Field Blank Data Qualification Summary - SDG 22C288

No Sample Data Qualified in this SDG

VALIDATION COMPLETENESS WORKSHEET LDC #: 54717C6 Stage 2B Page: I of SDG #: 22C288 Reviewer: AT Laboratory: EMAX Laboratories, Inc., Torrance, CA 2nd Reviewer: /

METHOD: (Analyte) Ferrous Iron (SM3500-FE B), Silica, Dissolved Silica (SM4500-SIO2 C)

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
l.	Sample receipt/Technical holding times	+,A	
- 11	Initial calibration	A	
111.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	N_	
VI.	Matrix Spike/Matrix Spike Duplicates	A	From SDG 22C287 (HU092 MS/MSD)
VII.	Duplicate sample analysis	A	V (V DUP)
VIII.	Laboratory control samples	A	LCS/LCSD
IX.	Field duplicates	N	
X.	Target Analyte Quantitation	N	
xı	Overall assessment of data	L A	

A = Acceptable Note:

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 HU088 22C288-01 Water 03/22/22 2 3 4 5 6 8 9 10 11 12 13 14

NOIGS	

LDC #: 54717C6

VALIDATION FINDINGS WORKSHEET Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: ATV

All circled methods are applicable to each sample.

Sample ID	Parameter
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC C16+ C104 (Fe2) (SID2) (SID2) (SID2)
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ AIK CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ AIK CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ AIK CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ AIK CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	PH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4

Comments:__

Laboratory Data Consultants, Inc. Data Validation Report

Red Hill Oily Waste Disposal Facility, CTO 18F0176 **Project/Site Name:**

LDC Report Date: August 17, 2022

Parameters: Total Petroleum Hydrocarbons as Extractables

Stage 2B Validation Level:

Laboratory: EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C288

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU088	22C288-01	Water	03/22/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), 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.
- Χ (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

- ICP Serial Dilution %D was not within control limits.
- b Presumed contamination from preparation (method blank).
- Calibration %RSD, r, r², %D or %R was noncompliant. С
- The analysis with this flag should not be used because another more technically d sound analysis is available.
- MS/MSD or Duplicate RPD was high. е
- f Presumed contamination from FB or ER.
- ICP ICS results were unsatisfactory. g
- Holding times were exceeded. h
- i Internal standard performance was unsatisfactory.
- k Estimated Maximum Possible Concentration (HRGC/HRMS only)
- ı LCS/LCSD %R was not within control limits.
- Result exceeded the calibration range. m
- Cooler temperature or temperature blank was noncompliant and/or sample 0 custody problems.
- RPD between two columns was high (GC only). p
- MS/MSD recovery was not within control limits. q
- Surrogate recovery was not within control limits. S
- t Presumed contamination from trip blank.
- Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.
- LCS/LCSD RPD was high. W
- Chemical recovery was not within control limits (Radiochemistry only). У

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

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

No field duplicates were identified in this SDG.

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 Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary -**SDG 22C288**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data **Qualification Summary - SDG 22C288**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 22C288

No Sample Data Qualified in this SDG

SDG #	: 54717C8a VALIDATIO : 22C288 atory: EMAX Laboratories, Inc., Torranc	S	LETENESS tage 2B	S WORKSHE	F	Date: 8 17 2 Page: lof 7 Reviewer: 7 Reviewer: 7
ИЕТН	OD: GC TPH as Extractables (EPA SW	/-846 Metho	od 8015C)		£IIQ I	Ve Alestei -
	amples listed below were reviewed for e ion findings worksheets.	ach of the fo	ollowing valida	ition areas. Vali	dation findings are	noted in attached
	Validation Area			Co	omments	
l.	Sample receipt/Technical holding times	AIA	1			
11.	Initial calibration/ICV	ΔΙΔ	% P50	4 W	NEW	
111.	Continuing calibration	A	'	4CV = 20	n	
IV.	Laboratory Blanks	Δ		l		
V.	Field blanks	2				
VI.	Surrogate spikes	4				
VII.	Matrix spike/Matrix spike duplicates	N				
VIII.	Laboratory control samples	Δ	100 ID			
IX.	Field duplicates	N				
Χ.	Target analyte quantitation	N				
XI.	Target analyte identification	N				
XII	Overall assessment of data					
		-				
lote:	N = Not provided/applicable $R = R$	No compounds insate Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipmen		ce blank
	N = Not provided/applicable $R = R$	insate	s detected	TB = Trip blank	OTHER:	ce blank Date
- (N = Not provided/applicable R = R SW = See worksheet FB = I	insate	s detected	TB = Trip blank EB = Equipmen	OTHER:	
1-1	N = Not provided/applicable R = R SW = See worksheet FB = I	insate	s detected	TB = Trip blank EB = Equipmen	OTHER:	Date
	N = Not provided/applicable R = R SW = See worksheet FB = I	insate	s detected	TB = Trip blank EB = Equipmen	OTHER:	Date
1 H	N = Not provided/applicable R = R SW = See worksheet FB = I	insate	s detected	TB = Trip blank EB = Equipmen	OTHER:	Date
1 F	N = Not provided/applicable R = R SW = See worksheet FB = I	insate	s detected	TB = Trip blank EB = Equipmen	OTHER:	Date
1 H	N = Not provided/applicable R = R SW = See worksheet FB = I	insate	s detected	TB = Trip blank EB = Equipmen	OTHER:	Date
1 H	N = Not provided/applicable R = R SW = See worksheet FB = I	insate	s detected	TB = Trip blank EB = Equipmen	OTHER:	Date
1	N = Not provided/applicable R = R SW = See worksheet FB = I	insate	s detected	TB = Trip blank EB = Equipmen	OTHER:	Date
1	N = Not provided/applicable R = R SW = See worksheet FB = I	insate	s detected	TB = Trip blank EB = Equipmen	OTHER:	Date
1	N = Not provided/applicable R = R SW = See worksheet FB = I	insate	s detected	TB = Trip blank EB = Equipmen	OTHER:	Date
1	N = Not provided/applicable R = R SW = See worksheet FB = I	insate	s detected	TB = Trip blank EB = Equipmen	OTHER:	Date
1	N = Not provided/applicable R = R SW = See worksheet FB = I	insate	s detected	TB = Trip blank EB = Equipmen	OTHER:	Date
1	N = Not provided/applicable R = R SW = See worksheet FB = I	insate	s detected	TB = Trip blank EB = Equipmen	OTHER:	Date
1	N = Not provided/applicable R = R SW = See worksheet FB = R	insate	s detected	TB = Trip blank EB = Equipmen	OTHER:	Date
1	N = Not provided/applicable R = R SW = See worksheet FB = I	insate	s detected	TB = Trip blank EB = Equipmen	OTHER:	Date

Laboratory Data Consultants, Inc. Data Validation Report

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Project/Site Name:

LDC Report Date: September 26, 2022

Wet Chemistry Parameters:

Validation Level: Stage 2B

EMAX Laboratories, Inc., Torrance, CA Laboratory:

Sample Delivery Group (SDG): 22C308

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU096	22C308-01	Water	03/23/22
HU096MS	22C308-01MS	Water	03/23/22
HU096MSD	22C308-01MSD	Water	03/23/22
HU096DUP	22C308-01DUP	Water	03/23/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3 (2019), and the DoD General Validation Guidelines (November 2019). 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 methods:

Ferrous Iron by Standard Method 3500-Fe B Silica and Dissolved Silica by Standard Method 4500-SiO2 C

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.
- (Estimated, Low Bias): The analyte was analyzed for and positively identified by Jthe 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.
- Χ (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

- ICP Serial Dilution %D was not within control limits. а
- Presumed contamination from preparation (method blank). b
- Calibration %RSD, r, r², %D or %R was noncompliant. С
- The analysis with this flag should not be used because another more d technically sound analysis is available.
- MS/MSD or Duplicate RPD was high. е
- f Presumed contamination from FB or ER.
- ICP ICS results were unsatisfactory. g
- h Holding times were exceeded.
- Internal standard performance was unsatisfactory.
- k Estimated Maximum Possible Concentration (HRGC/HRMS only)
- 1 LCS/LCSD %R was not within control limits.
- Result exceeded the calibration range. m
- Cooler temperature or temperature blank was noncompliant and/or sample 0 custody problems.
- RPD between two columns was high (GC only). р
- MS/MSD recovery was not within control limits. q
- s Surrogate recovery was not within control limits.
- t Presumed contamination from trip blank.
- Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.
- LCS/LCSD RPD was high. W
- Chemical recovery was not within control limits (Radiochemistry only). У

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

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. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XI. Overall Assessment of Data

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

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Data Qualification Summary - SDG 22C308

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 22C308

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Field Blank Data Qualification Summary - SDG 22C308

No Sample Data Qualified in this SDG

LDC #: 54717D6 VALIDATION COMPLETENESS WORKSHEET SDG #: 22C308 Stage 2B Page

Laboratory: EMAX Laboratories, Inc., Torrance, CA

METHOD: (Analyte) Ferrous Iron (SM3500-FE B), Silica, Dissolved Silica (SM4500-SIO2 C)

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
l.	Sample receipt/Technical holding times	AIA	
П	Initial calibration	A	
111.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	<u>l</u> N	
VI.	Matrix Spike/Matrix Spike Duplicates	A	(2,3), From SDG # 22C287 (HU09ZMS/MSD)
VII.	Duplicate sample analysis	A	4 (V DUP)
VIII.	Laboratory control samples	A	LCS/LCSD
IX.	Field duplicates	N	
X.	Target Analyte Quantitation	N	
_x	Overall assessment of data	A	

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 HU096 22C308-01 Water 03/23/22 2 HU096MS 22C308-01MS Water 03/23/22 HU096MSD 22C308-01MSD Water 03/23/22 3 HU096DUP 22C308-01DUP Water 03/23/22 4 5 6 8 9 10 11 12 13 14

Notes:		

LDC #: 54717DG

VALIDATION FINDINGS WORKSHEET Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: 411

All circled methods are applicable to each sample.

Sample ID	Parameter
1	ph TDS CI F NO $_3$ NO $_2$ SO $_4$ O-PO $_4$ AIK CN NH $_3$ TKN TOC Cr6+ CIO $_4$ ($7e^2$) (302) (302) (302)
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ AIk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ AIK CN NH ₃ TKN TOC Cr6+ CIO ₄
QC	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ AIK CN NH ₃ TKN TOC Cr6+ CIO ₄
2,3,4	PH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4 (Fe2t)
, , ,	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ AIK CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ AIK CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4

Comments:	Comments:						
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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

August 17, 2022

Parameters:

Total Petroleum Hydrocarbons as Extractables

Validation Level:

Stage 2B

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C308

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU096	22C308-01	Water	03/23/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), 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

- ICP Serial Dilution %D was not within control limits.
- b Presumed contamination from preparation (method blank).
- Calibration %RSD, r, r², %D or %R was noncompliant. С
- d The analysis with this flag should not be used because another more technically sound analysis is available.
- MS/MSD or Duplicate RPD was high. е
- f Presumed contamination from FB or ER.
- ICP ICS results were unsatisfactory. g
- h Holding times were exceeded.
- i Internal standard performance was unsatisfactory.
- k Estimated Maximum Possible Concentration (HRGC/HRMS only)
- 1 LCS/LCSD %R was not within control limits.
- m Result exceeded the calibration range.
- Cooler temperature or temperature blank was noncompliant and/or sample 0 custody problems.
- RPD between two columns was high (GC only). р
- MS/MSD recovery was not within control limits. q
- Surrogate recovery was not within control limits.
- t Presumed contamination from trip blank.
- 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.
- Chemical recovery was not within control limits (Radiochemistry only). У

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

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

No field duplicates were identified in this SDG.

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 Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary -**SDG 22C308**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data **Qualification Summary - SDG 22C308**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 22C308

No Sample Data Qualified in this SDG

SDG #	t: 54717D8a VALIDATIO t: 22C308 atory: EMAX Laboratories, Inc., Torrance	S	PLETENES: tage 2B	S WORKSHEET		Date: <u>\(\) </u> Page: <u>\(\) </u> Reviewer: <u>\(\) </u> Reviewer: <u>\(\) </u>
NETH	IOD: GC TPH as Extractables (EPA SW	/-846 Metho	od 8015C)			1011011011
	amples listed below were reviewed for extion findings worksheets.	ach of the fo	ollowing valida	ation areas. Validatio	n findings are	noted in attached
	Validation Area			Comm	ents	
l.	Sample receipt/Technical holding times	A/A				
11.	Initial calibration/ICV	4/1		ly =w		
III.	Continuing calibration endur			W = 20 W		·
IV.	Laboratory Blanks	Δ		•		
V.	Field blanks	N				· · · · · · · · · · · · · · · · · · ·
VI.	Surrogate spikes	Δ				
VII.	Matrix spike/Matrix spike duplicates	N				
VIII.	Laboratory control samples	A	Lesip	·		
IX.	Field duplicates	V				
X.	Target analyte quantitation	N				·
XI.	Target analyte identification	N				
XII	Overall assessment of data					
lote:	N = Not provided/applicable R = Ri	No compounds insate Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipment blan	OTHER:	rce blank
	Client ID					
1				Lab ID	Matrix	Date
	HU096			22C308-01	Matrix Water	Date 03/23/22
2	HU096					
	HU096					
3	HU096					
3 4	HU096					
2 3 4 5 6	HU096					
3 4 5	HU096					
3 4 5 6	HU096					
3 4 5 6 7	HU096					
3 4 5 6 7 8	HU096					
3 4 5 6 7 8 9	HU096					
3 4 5 6 7 8 9 10	HU096					
3 4 5 6 7 8 9 10 11 12	HU096					
3 4 5 6 7 8 9 10 11 12 13 lotes:						
3 4 5 6 7 8 9 10 11 12 13 lotes:	18 kl					
3 4 5 6 7 8 9 10 11 12 13 lotes:						

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

September 26, 2022

Parameters:

Wet Chemistry

Validation Level:

Stage 2B

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C309

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU072	22C309-01	Water	03/23/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3 (2019), and the DoD General Validation Guidelines (November 2019). 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 methods:

Ferrous Iron by Standard Method 3500-Fe B Silica and Dissolved Silica by Standard Method 4500-SiO2 C

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.
- (Exclusion of data recommended): The sample results (including non-detects) Χ 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)
- I 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.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

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. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XI. Overall Assessment of Data

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

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Data Qualification Summary - SDG 22C309

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 22C309

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Field Blank Data Qualification Summary - SDG 22C309

No Sample Data Qualified in this SDG

SDG	#: 54717E6 VALIDAT #: 22C309 ratory: EMAX Laboratories, Inc., Torrar	5	PLETENESS WORKSHEET Stage 2B		Date: 9/22/22 Page: _l of _l Reviewer:411/ Reviewer:27
METH	HOD: (Analyte) Ferrous Iron (SM3500-	-FE B), Silica	, Dissolved Silica (SM4500-SIO2 C	<u>) </u>	
	amples listed below were reviewed for tion findings worksheets.	each of the f	following validation areas. Validation	n findings are	noted in attached
	Validation Area		Comme	ents	
I.	Sample receipt/Technical holding times	AA			
ii.	Initial calibration	A			
III.	Calibration verification	A			
IV	Laboratory Blanks	A			
V	Field blanks	N			
VI.	Matrix Spike/Matrix Spike Duplicates	A	From SDG # 22C 287 (HU09Z	MS/MSD).	220308 (HU090 M
VII.	Duplicate sample analysis	A	1 (1	DUP)	V (V D)
VIII.	Laboratory control samples	<u> </u>	LCS LCSD		
IX.	Field duplicates	N			
<u>X.</u>	Target Analyte Quantitation	N			
LxL	Overall assessment of data	A			
Note:	N = Not provided/applicable R =	= No compound Rinsate = Field blank	s detected D = Duplicate TB = Trip blank EB = Equipment blank	OTHER	ırce blank
	Client ID		Lab ID	Matrix	Date
1	HU072		22C309-01	Water	03/23/22
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					-
14					
15					
Notes	:				

LDC #: 54717EG

VALIDATION FINDINGS WORKSHEET Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: ATC

All circled methods are applicable to each sample.

Sample ID	Parameter
	PH TDS CI F NO, NO, SO, O-PO, AIK CN NH, TKN TOC Cr6+ CIO, FEZT SIDZ SIDZ
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	ph TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ AIK CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO $_3$ NO $_2$ SO $_4$ O-PO $_4$ Alk CN NH $_3$ TKN TOC Cr6+ ClO $_4$
	pH TDS CLF NO $_3$ NO $_2$ SO $_4$ O-PO $_4$ Alk CN NH $_3$ TKN TOC Cr6+ ClO $_4$
	pH TDS CLF NO $_3$ NO $_2$ SO $_4$ O-PO $_4$ Alk CN NH $_3$ TKN TOC Cr6+ ClO $_4$
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CLF NO $_3$ NO $_2$ SO $_4$ O-PO $_4$ Alk CN NH $_3$ TKN TOC Cr6+ ClO $_4$
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4

Comments:

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

August 17, 2022

Parameters:

Total Petroleum Hydrocarbons as Extractables

Validation Level:

Stage 2B

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C309

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU072	22C309-01	Water	03/23/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), 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)
- I 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

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

No field duplicates were identified in this SDG.

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 Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary -**SDG 22C309**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data **Qualification Summary - SDG 22C309**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 22C309

No Sample Data Qualified in this SDG

SDG Labor	#:22C309 ratory:_EMAX_Laboratories, Inc., Torrance	e, CA	LETENESS WO tage 2B	RKSHEET	Re 2nd Re	Date: 8 11 Page: lof / viewer: 15 viewer:
The s	HOD: GC TPH as Extractables (EPA SW amples listed below were reviewed for extraction findings worksheets.		·	eas. Validation		
	Validation Area			Comme	nts	
l.	Sample receipt/Technical holding times	AA				
11.	Initial calibration/ICV	4/4	% PSD/1CY =	w		
<u>III.</u>	Continuing calibration endure	Δ		20/20		
IV.	Laboratory Blanks	<u> </u>				
V.	Field blanks	N				
VI.	Surrogate spikes	Δ,				
VII.	Matrix spike/Matrix spike duplicates	N				
VIII.	Laboratory control samples	<u>A</u>	KS IV			
IX.	Field duplicates	l N				
_X	Target analyte quantitation	N				
XI.	Target analyte identification	N A				
XII	Overall assessment of data					
Vote:	A = Acceptable ND = N N = Not provided/applicable R = Ri	No compounds		Duplicate Trip blank	SB=Source OTHER:	blank
		Field blank		Equipment blank		
				Equipment blank	Matrix	Date
1	SW = See worksheet FB = F		EB =	Equipment blank		Date 03/23/22
1	SW = See worksheet FB = F		EB =	Equipment blank	Matrix	<u> </u>
1	SW = See worksheet FB = F		EB =	Equipment blank	Matrix	<u> </u>
2	SW = See worksheet FB = F		EB =	Equipment blank	Matrix	<u> </u>
3	SW = See worksheet FB = F		EB =	Equipment blank	Matrix	
3 4	SW = See worksheet FB = F		EB =	Equipment blank	Matrix	
2 3 4 5	SW = See worksheet FB = F		EB =	Equipment blank	Matrix	
2 3 4 5 6	SW = See worksheet FB = F		EB =	Equipment blank	Matrix	
2 3 4 5 6 7	SW = See worksheet FB = F		EB =	Equipment blank	Matrix	
2 3 4 5 6 7 8 9	SW = See worksheet FB = F		EB =	Equipment blank	Matrix	
2 3 4 5 6 7 8 9	SW = See worksheet FB = F		EB =	Equipment blank	Matrix	
2 3 4 5 6 7 8	SW = See worksheet FB = F		EB =	Equipment blank	Matrix	
2 3 4 5 6 7 8 9 10 11 12	SW = See worksheet FB = F		EB =	Equipment blank	Matrix	<u> </u>
2 3 4 5 6 7 8 9 10 11	SW = See worksheet FB = F		EB =	Equipment blank	Matrix	<u> </u>
2 3 4 5 6 7 8 9 10 11 12	SW = See worksheet FB = F		EB =	Equipment blank	Matrix	<u> </u>
2 3 4 5 6 7 8 9 10 11 12	SW = See worksheet FB = F		EB =	Equipment blank	Matrix	<u> </u>

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

September 26, 2022

Parameters:

Wet Chemistry

Validation Level:

Stage 2B

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C311

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU079	22C311-01	Water	03/23/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3 (2019), and the DoD General Validation Guidelines (November 2019). 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 methods:

Ferrous Iron by Standard Method 3500-Fe B Silica and Dissolved Silica by Standard Method 4500-SiO2 C

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.
- Х (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)
- I 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.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

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. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XI. Overall Assessment of Data

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

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Data Qualification Summary - SDG 22C311

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 22C311

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Field Blank Data Qualification Summary - SDG 22C311

No Sample Data Qualified in this SDG

SDG #	#:54717F6VALIDATIO #:22C311 atory: EMAX Laboratories, Inc., Torrance	5	PLETENES: Stage 2B	S WORKSHE	ET F 2nd F	Date: 9 22 2 Page: 1 of 1 Reviewer: 4 10 Reviewer: 4
-	HOD: (Analyte) Ferrous Iron (SM3500-FE		*	-		noted in attached
	amples listed below were reviewed for eation findings worksheets.	ach of the i	ollowing valida	ation areas. Valid	ation indings are	noted in attached
	Validation Area			Co	mments	
ı.	Sample receipt/Technical holding times	AIA				
. 11	Initial calibration	+				
III.	Calibration verification	A				
IV	Laboratory Blanks	A				
V	Field blanks	N				
VI.	Matrix Spike/Matrix Spike Duplicates	A	From SDG#	22C308 (HU	09GMSIMSD), 2	2C287 (HU092 M
VII.	Duplicate sample analysis	A		¥ (,	J DUP)	VVD
VIII.	Laboratory control samples	A	LCS/LCS	.D	, ,	
IX.	Field duplicates	N		,		
X.	Target Analyte Quantitation	N				
XL	Overall assessment of data	A				
Note:	N = Not provided/applicable $R = Ringer$	lo compound nsate ield blank	s detected	D = Duplicate TB = Trip blank EB = Equipment	SB=Sour OTHER: blank	rce blank
	Client ID			Lab ID	Matrix	Date
1	HU079			22C311-01	Water	03/23/22
2						
3						
4		2				
5						
6						
7						٧.
8						
9		-				
10						
11				J		
12						
		·				

Notes:

LDC #: 54717 FG

VALIDATION FINDINGS WORKSHEET Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: ATV

All circled methods are applicable to each sample.

Sample ID	Parameter
1	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC C16+ C1O4 (Fe ²⁺) (SiO2) (SiO2) (SiO2)
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO $_3$ NO $_2$ SO $_4$ O-PO $_4$ Alk CN NH $_3$ TKN TOC Cr6+ ClO $_4$
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4

Comments:		

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

August 17, 2022

Parameters:

Total Petroleum Hydrocarbons as Extractables

Validation Level:

Stage 2B

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C311

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU079	22C311-01	Water	03/23/22
HU080	22C311-02	Water	03/23/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), 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.
- Χ (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)
- I 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

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 HU079 and HU080 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 Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary -**SDG 22C311**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data **Qualification Summary - SDG 22C311**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 22C311

No Sample Data Qualified in this SDG

SDG Laboi	#: 54717F8a VALIDAT #: 22C311 ratory: EMAX Laboratories, Inc., Torran HOD: GC TPH as Extractables (EPA S	nce, CA	Stage 2B	S WORKSHEE	İ	Date: 8 17 2 Page: 10f 1 Reviewer: Reviewer: 1	
	amples listed below were reviewed for tion findings worksheets.	each of the fo	ollowing valida	ation areas. Valida	ation findings are	noted in attached	
	Validation Area Comments						
1.	Sample receipt/Technical holding times	AIA					
II.	Initial calibration/ICV	A-1A	o/u psp	1cy = 20			
III.	Continuing calibration ending	Δ	,	CW = 20/2			
IV.	Laboratory Blanks	A					
V.	Field blanks	N		·			
VI.	Surrogate spikes	A					
VII.	Matrix spike/Matrix spike duplicates	N	`				
VIII.	Laboratory control samples	Δ	10519				
IX.	Field duplicates	NV)	0=12	•			
X.	Target analyte quantitation	N					
XI.	Target analyte identification	N					
LXIL	Overall assessment of data	T P					
Note:	N = Not provided/applicable R =	= No compound: Rinsate = Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipment b	OTHER:	rce blank	
	Client ID			Lab ID	Matrix	Date	
1	HU079 /			22C311-01	Water	03/23/22	
2	ниово 🕜	<u>-</u>		22C311-02	Water	03/23/22	
3		·					
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Notes:							
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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

September 26, 2022

Parameters:

Wet Chemistry

Validation Level:

Stage 2B

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C312

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU082	22C312-01	Water	03/23/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3 (2019), and the DoD General Validation Guidelines (November 2019). 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 methods:

Ferrous Iron by Standard Method 3500-Fe B Silica and Dissolved Silica by Standard Method 4500-SiO2 C

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.
- Χ (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)
- 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.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

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. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XI. Overall Assessment of Data

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

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Data Qualification Summary - SDG 22C312

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 22C312

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Field Blank Data Qualification Summary - SDG 22C312

No Sample Data Qualified in this SDG

SDG :	#: 54717G6 VALIDAT #: 22C312 atory: EMAX Laboratories, Inc., Torran	S	PLETENESS WORKSHEET Stage 2B	Date: 9 22 2 Page: 1 of 1 Reviewer: 411 2nd Reviewer: 7
	HOD: (Analyte) Ferrous Iron (SM3500-			
	amples listed below were reviewed for tion findings worksheets.	each of the f	following validation areas. Validation find	dings are noted in attached
<u> </u>	Validation Area		Comments	
<u>l.</u>	Sample receipt/Technical holding times	AIA		
	Initial calibration	A		
1)	Calibration verification	A		
111.	Calibration verification			
III. IV	Laboratory Blanks	A		
		A		
IV	Laboratory Blanks	A N A	From SDG # 22C308 (HUDGG MS/M	(SD), 22C287 (HU092M)/1
IV V	Laboratory Blanks Field blanks Matrix Spike/Matrix Spike Duplicates	A A A	From SDG # 22C308 (HUDGG MS/M	(D), 22C287 (HU092M)/
V VI.	Laboratory Blanks Field blanks	<u> </u>	From SDG # 22C308 (HUDGG US/M V (V DUP)	(SD), 22C287 (HU092M5/1), J (J) DUP)
V VI.	Laboratory Blanks Field blanks Matrix Spike/Matrix Spike Duplicates Duplicate sample analysis	A	V (V DUP)	(D), 22C287 (HU092M)/), J (J) DUP)
VI. VII.	Laboratory Blanks Field blanks Matrix Spike/Matrix Spike Duplicates Duplicate sample analysis Laboratory control samples	A	V (V DUP)	(D), 22C287 (HU092MS/I), J (JDUP)

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 blar OTHER:

	Client ID	Lab ID	Matrix	Date
1	HU082	22C312-01	Water	03/23/22
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13				
14				
15				
lote	0'			

LDC #: 5471796

VALIDATION FINDINGS WORKSHEET Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: ATV

All circled methods are applicable to each sample.

Sample ID	Parameter
1	PH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC C16+ C104 (Fe2) (SiO2) (SIO2) (SIO2)
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ AIK CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	ph TDS CLF NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CLF NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	PH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	PH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	PH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	PH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4

Comments:

Laboratory Data Consultants, Inc. **Data Validation Report**

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Project/Site Name:

LDC Report Date: August 17, 2022

Total Petroleum Hydrocarbons as Extractables Parameters:

Validation Level: Stage 2B

EMAX Laboratories, Inc., Torrance, CA Laboratory:

Sample Delivery Group (SDG): 22C312

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU082	22C312-01	Water	03/23/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), 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:

- (Estimated, High Bias): The analyte was analyzed for and positively identified by J+ 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.
- Χ (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

- ICP Serial Dilution %D was not within control limits.
- Presumed contamination from preparation (method blank). b
- Calibration %RSD, r, r², %D or %R was noncompliant. С
- The analysis with this flag should not be used because another more technically d sound analysis is available.
- MS/MSD or Duplicate RPD was high. е
- f Presumed contamination from FB or ER.
- ICP ICS results were unsatisfactory. g
- Holding times were exceeded. h
- Internal standard performance was unsatisfactory. i
- Estimated Maximum Possible Concentration (HRGC/HRMS only) k
- I LCS/LCSD %R was not within control limits.
- Result exceeded the calibration range. m
- Cooler temperature or temperature blank was noncompliant and/or sample 0 custody problems.
- RPD between two columns was high (GC only). р
- MS/MSD recovery was not within control limits. q
- Surrogate recovery was not within control limits. s
- t Presumed contamination from trip blank.
- Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.
- LCS/LCSD RPD was high. W
- Chemical recovery was not within control limits (Radiochemistry only). У

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

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

No field duplicates were identified in this SDG.

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 Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary -**SDG 22C312**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data **Qualification Summary - SDG 22C312**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 22C312

No Sample Data Qualified in this SDG

SDG#	t: 54717G8a VALIDATIO t: 22C312 atory: EMAX Laboratories, Inc., Torrand	S	LETENE tage 2B	SS WORKSHEET		Date: 8/17/1 Page:lof/ Reviewer:
METH	IOD: GC TPH as Extractables (EPA SV	V-846 Metho	d 8015C)		∠na i	Reviewer:
The sa	amples listed below were reviewed for e tion findings worksheets.	each of the fo	ollowing val	idation areas. Validatio	n findings are	noted in attached
	Validation Area			Comm	ents	
1.	Sample receipt/Technical holding times	14/4				
II.	Initial calibration/ICV	★ , △	0(.	250/1W=W		
111.	Continuing calibration ending	Δ		(W = 20 W		
IV.	Laboratory Blanks	Δ		•		
V.	Field blanks	N				
VI.	Surrogate spikes	Δ				
VII.	Matrix spike/Matrix spike duplicates	N				
VIII.	Laboratory control samples	Δ	rcs 10			
IX.	Field duplicates	N				
X.	Target analyte quantitation	N				
XI.	Target analyte identification	N				
XII	Overall assessment of data					
Note:	N = Not provided/applicable R = R	No compounds insate Field blank	detected	D = Duplicate TB = Trip blank EB = Equipment blan	OTHER:	rce blank
<u> </u>	Client ID			Lab ID	Matrix	Date
1 1	HU082			22C312-01	Water	03/23/22
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Notes:	MBIKIN					

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

September 26, 2022

Parameters:

Wet Chemistry

Validation Level:

Stage 4

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C313

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU090	22C313-01	Water	03/23/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3 (2019), and the DoD General Validation Guidelines (November 2019). 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 methods:

Ferrous Iron by Standard Method 3500-Fe B Silica and Dissolved Silica by Standard Method 4500-SiO2 C

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (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:

- (Estimated, High Bias): The analyte was analyzed for and positively identified by J+ 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.
- (Estimated, Bias Indeterminate): The analyte was analyzed for and positively J 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.
- Χ (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

- ICP Serial Dilution %D was not within control limits. а
- Presumed contamination from preparation (method blank). b
- Calibration %RSD, r, r², %D or %R was noncompliant. С
- The analysis with this flag should not be used because another more d technically sound analysis is available.
- MS/MSD or Duplicate RPD was high. е
- f Presumed contamination from FB or ER.
- ICP ICS results were unsatisfactory. g
- h Holding times were exceeded.
- Internal standard performance was unsatisfactory. i
- Estimated Maximum Possible Concentration (HRGC/HRMS only) k
- LCS/LCSD %R was not within control limits. I
- Result exceeded the calibration range. m
- Cooler temperature or temperature blank was noncompliant and/or sample 0 custody problems.
- RPD between two columns was high (GC only). р
- MS/MSD recovery was not within control limits. q
- s Surrogate recovery was not within control limits.
- t Presumed contamination from trip blank.
- Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.
- LCS/LCSD RPD was high. W
- Chemical recovery was not within control limits (Radiochemistry only).

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

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. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

All target analyte quantitations were acceptable.

XI. Overall Assessment of Data

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

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Data Qualification Summary - SDG 22C313

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 22C313

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Field Blank Data Qualification Summary - SDG 22C313

No Sample Data Qualified in this SDG

SDG#	DC #: 54717H6 VALIDATION COMPLETENESS WORKSHEET SDG #: 22C313 Stage 4 Laboratory: EMAX Laboratories, Inc., Torrance, CA					Date: 9 22 22 Page: 1 of 1 Reviewer: 41 2nd Reviewer: 2		
METH	OD: (Analyte) Ferrous Iron (SM3500-	FE B), Silica	, Dissolved Silica	(SM4500-SIC	02 C)			
	amples listed below were reviewed for ion findings worksheets.	each of the f	following validatio	n areas. Valid	ation findings are	noted in attached		
	Validation Area			Comments				
I.	Sample receipt/Technical holding times	AIA						
II	Initial calibration	A						
111.	Calibration verification	A						
IV	Laboratory Blanks	A						
<u></u>	Field blanks	N_						
VI.	Matrix Spike/Matrix Spike Duplicates	A	From SDG #2	<u> 20308 (4100</u>	196MS/MSD), 2	2C287 (HU092YS/		
VII.	Duplicate sample analysis	<u> </u>	,	V (V	DUP);	1 (1 DUP)		
VIII.	Laboratory control samples	A	LCS/LCSD		,			
IX.	Field duplicates	<u> </u>						
X.	Target Analyte Quantitation	A_						
XL	Overall assessment of data	<u> </u>			· · · · · · · · · · · · · · · · · · ·			
Note:	N = Not provided/applicable R = I	= No compound: Rinsate : Field blank	•	D = Duplicate TB = Trip blank EB = Equipment I	OTHER:	rce blank		
c	Client ID		L;	ab ID	Matrix	Date		
1	HU090		22	2C313-01	Water	03/23/22		
2								
3								
4								
5								
6								
7								
8		<u></u>		<u> </u>				
9								
10								
11								
12								
13								
14								
15 L Notes:								

Page 1 of 2 Reviewer: ATL

METHOD: Inorganics Validation Area Yes No NA **Comments** I. Technical holding times Were all technical holding times met? II. Calibration Were all instruments calibrated at the \checkmark required frequency? Were the proper number of standards **✓** used? Were all initial and continuing calibration verifications within the QC limits? Were all initial calibration correlation coefficients within limits as specifed by the method? Were balance checks performed as required? III. Blanks Was a method blank associated with every sample in this SDG? Was there contamination in the method blanks? Was there contamination in the initial and continuing calibration blanks? IV. Matrix Spike/Matrix Spike Duplicates/Laboratory Duplicates Were MS/MSD recoveries within the QC limits? (If the sample concentration exceeded the spike concentration by a factor of 4, no action was taken.) Were the MS/MSD or laboratory duplicate relative percent differences (RPDs) within the QC limits? V. Laboratory Control Samples Was a LCS analyzed for each batch in the SDG? Were the LCS recoveries and RPDs (if applicable) within QC limits? X. Target Analyte Quantitation Were all reporting limits adjusted to reflect sample dilutions? Were all soil samples dry weight corrected? XI. Overall Assessment of Data Was the overall assessment of the data found to be acceptable?

Reviewer: ATL

METHOD: Inorganics				
Validation Area	Yes	No	NA	Comments
XII. Field Duplicates				
Were field duplicates identifed in this SDG?		V		
Were target analytes detected in the field duplicates?			V	
XIII. Field Blanks				
Were field blanks identified in this SDG?		V		
Were target analytes detected in the field blanks?			V	

LDC #: 54717+16

VALIDATION FINDINGS WORKSHEET Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: ATU

All circled methods are applicable to each sample.

Sample ID	Parameter
1	
- !	PH TDS CLE NO. NO. SO. O. PO. AIK CN NH. TKN TOC Cr6+ CIO (Fe ²⁺) SiO2 (SiO2Dis)
	PH TDS CLF NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH_TDS_CI_F_NO_NO_SO_O_PO_AIK CN NH3 TKN TOC Cr6+ ClO_
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	ph TDS Cl F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	ph TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	PH TDS CLF NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CLF NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	ph TDS CLF NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	ph TDS CLF NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	ph TDS CLF NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	ph TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
1	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CLF NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
1	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CLF NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4

Comments:					
-		 	 	 	

LDC #: 54717HG

Validation Findings Worksheet Initial and Continuing Calibration Calculation Verification

Page:	of	
Reviewer	: ATV	

Method: Inorganics, Method	see cover		
The correlation coefficient (r) for the ca	alibration of <u>S102</u>	was recalculated.Calibration date:	03/31/22
An initial or continuing calibration veri	fication percent recov	very (%R) was recalculated for each type	e of analysis using the following formula:
%R = <u>Found X 100</u>	Where, F	Found = concentration of each analyte <u>m</u>	neasured in the analysis of the ICV or CCV solution
True	7	Frue = concentration of each analyte in	the ICV or CCV source

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (mg/L)	Response	r or r ²	r or r ²	(Y/N)
Initial calibration		s1	0	0			
		s2	2	0.053	0.99860	0.99930	
		s3	5	0.134	:		. ,
	3102	s4	10	0.263	,		У
		s5	15	0.388			/
		s6	20	0.526			
		s7	25	0.624			
CCV2 Calibration verification	3102	FOUND 15.126	TRUE 15.000		101	loo	У
CW2 Calibration verification	SiOZ (DIS)	15.008	15.000		100	100	У
CW2 Calibration verification	Fe ²	14.951	15.000		100	100	У

Comments: Refer to Calibration V	/erification findings worksheet fo	or list of qualifications and associa	ated samples when reported i	esults do not agree within
10.0% of the recalculated results.				

LDC #: 54717+10

VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Page:	Lof_L	
Reviewer:	ATV	

METHOD: Inorganics, Method _	see cover
------------------------------	-----------

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

 $%R = Found \times 100$ True Where,

Found =

concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,

Found = SSR (spiked sample result) - SR (sample result).

True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = |S-D| \times 100$

Where,

S =

Original sample concentration

(S+D)/2

D=

Duplicate sample concentration

Sample ID	Type of Analysis	Element	· mg L Found/S (units)	mglL True/D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
ics	Laboratory control sample	Fe ^{2†}	14.951	15.00O	100	99	Y
22C287-01MS From SDG # 22C287	Matrix spike sample	(DIS) SiO2	(SSR-SR) 68.073	75.000	91	91	Y
22C 287-01 DUF From SDG+# 22C 287	Duplicate sample	SiOZ	25.968	25.968	0	0	Y

Comments:		
1		

LDC #: 54717+16

VALIDATION FINDINGS WORKSHEET

Sample Calculation Verification

Page:_	of
Reviewer:	ATT

METHOD: Inor	rganics, Method <u>See (</u>	cover	
Please see qua Y N N/A Y N N/A Y N N/A	Have results been repo	rted and calculated correctly? alibrated range of the instruments?	ole questions are identified as "N/A".
	alyte) results for nd verified using the follow	SiD2 ving equation:	reported with a positive detect were
Concentration =		Recalculation:	

0.223 - 0.0053	X5	=	43.024
0.0253			

#	Sample ID	Analyte	Reported Concentration MG/L)	Calculated Concentration (MGL)	Acceptable (Y/N)
	1	Fe ² t	ND	ND.	V
		SiOZ	43	ND 43.024	\
		SiOz Dis	45.7	45.723	ý
		-	•		
 					
 					
-					
			-		

Note:	 	 	
	 		

Laboratory Data Consultants, Inc. **Data Validation Report**

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

August 17, 2022

Parameters:

Total Petroleum Hydrocarbons as Extractables

Validation Level:

Stage 4

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C313

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU090	22C313-01	Water	03/23/22
HU090(SGCU)	22C313-01(SGCU)	Water	03/23/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), 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 4 data validation, which is comprised of the quality control (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).
- (Non-detected estimated): The analyte was not detected and the associated UJ numerical value is approximate.
- Χ (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.
- (Not Applicable): The non-conformance discovered during data validation NA 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

- ICP Serial Dilution %D was not within control limits. а
- Presumed contamination from preparation (method blank). b
- Calibration %RSD, r, r², %D or %R was noncompliant. С
- The analysis with this flag should not be used because another more technically d sound analysis is available.
- MS/MSD or Duplicate RPD was high. е
- f Presumed contamination from FB or ER.
- ICP ICS results were unsatisfactory. g
- h Holding times were exceeded.
- Internal standard performance was unsatisfactory. i
- Estimated Maximum Possible Concentration (HRGC/HRMS only) k
- L LCS/LCSD %R was not within control limits.
- Result exceeded the calibration range. m
- Cooler temperature or temperature blank was noncompliant and/or sample 0 custody problems.
- RPD between two columns was high (GC only). р
- MS/MSD recovery was not within control limits. q
- S Surrogate recovery was not within control limits.
- t Presumed contamination from trip blank.
- Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.
- LCS/LCSD RPD was high. W
- Chemical recovery was not within control limits (Radiochemistry only). У

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

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

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

All target analyte quantitations met validation criteria.

XI. Target Analyte Identification

All target analyte identifications met validation criteria.

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 Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary -**SDG 22C313**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data **Qualification Summary - SDG 22C313**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 22C313

No Sample Data Qualified in this SDG

SDG # Labora MET H The sa	t: 54717H8a VALIDATIO t: 22C313 atory: EMAX Laboratories, Inc., Torrance IOD: GC TPH as Extractables (EPA SW amples listed below were reviewed for extion findings worksheets.	<u>e, CA</u> /-846 Metho	Stage 4 d 8015C)	SS WORKSHEET dation areas. Validat	2nd	Date: 9/17/ Page:of Reviewer: Reviewer:
	Validation Area			Comr	nents	
1.	Sample receipt/Technical holding times	Δ/Δ	_		-	
II.	Initial calibration/ICV	A/A	1/0 i	BD/ICY EN)	
III.	Continuing calibration ending	Δ	•	cu = w	m	
IV.	Laboratory Blanks	Δ				
V.	Field blanks	N				····
VI.	Surrogate spikes	A				
VII.	Matrix spike/Matrix spike duplicates	N				· · · · · · · · · · · · · · · · · · ·
VIII.	Laboratory control samples	A	100 1D			•
IX.	Field duplicates	N				
Х.	Target analyte quantitation	Δ				
XI.	Target analyte identification	A				
Note:	N = Not provided/applicable R = Ri	No compounds insate Field blank	detected	D = Duplicate TB = Trip blank EB = Equipment bla	OTHER	urce blank R:
-	Client ID			Lab ID	Matrix	Date
	HU090			22C313-01	Water	03/23/22
2	HU090(SGCU)			22C313-01(SGCU)	Water	03/23/22
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13 Notes:						
	49					**
	ABLKIW SAC		++			·
 '	1001		++			
$\vdash\vdash$					++	

LDC #: 547 17148a

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: FT

Method: /GC _HPLC

Metriod: 700 The Ed				
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	/			
Was cooler temperature criteria met?				
Ila. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?				
Were all percent relative standard deviations (%RSD) ≤ 20%?				
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥0.990?			/	
Were the RT windows properly established?		· .		
Ilb. Initial calibration verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?				
Were all percent differences (%D) ≤ 20%?				
III. Continuing calibration				
Was a continuing calibration analyzed daily?				
Were all percent differences (%D) ≤ 20%?				
Were all the retention times within the acceptance windows?				
IV. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?				
Was a laboratory blank analyzed for each matrix and concentration?				
Was there contamination in the laboratory blanks?				
V. Field Blanks				
Were field blanks identified in this SDG?				
Were target analytes detected in the field blanks?				
VI. Surrogate spikes				
Were all surrogate percent recovery (%R) within the QC limits?		-		
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			/	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?				
VII. Matrix spike/Matrix spike duplicates				
Were matrix spike (MS) and matrix spike duplicate (MSD) analyzed in this SDG?				
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?				
VIII. Laboratory control samples				
Was an LCS analyzed per analytical or extraction batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?				

LDC#: 54717H8a

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: FT

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#: 9/7/7/18/a

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Page:	_6f_/
Reviewer:	FT
2nd Reviewer:_	

METHOD: GC	HPLC	

The calibration factors (CF) and relative standard deviation (%RSD) were recalculated using the following calculations:

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

				Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
#	Standard ID	Calibration Date	Compound	CF \$⊅U std)	CF (500 std)	CF (initial)	CF (intial)	%RSD	%RSD
1	1041	8/12/21	Diesel ep-czy	27380	27380	26318.7	263187	9.7	9-7
		, , ,							
2									
3									
4									
	<u> </u>	<u> </u>	<u> </u>	<u> </u>	L	<u> </u>		<u> </u>	<u> </u>

Comments: Refe	<u>er to Initial Calibration</u>	findings worksheet	tor list of qualifica	<u>tions and associated</u>	<u>l samples when repo</u>	rted results do not agre	e within 10.0% of the
recalculated resu	ilts.						

LDC #: <u>547/7</u>#%

VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification

Page:_	<u>1</u> of <u>1</u>	
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 * (ave. CF -CF)/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		Reported	Recalculated	Reported	Recalculated
#			Tui got / ui.u. j.to	Average CF(Ical)/ CCV Conc.	CF/ Conc. CCV	CF/ Conc. CCV	%D	%D
1	cev	3/30/22	Diesel Go-en	200.0	543.98	543-98	9	9
		1218						
2	acv	3/30/22 1730	<i>J</i>	Į.	527.59	527.59	6	6
		1730						
3	dev	4/2/22		l	522.41	522.41	4	IJ
		0052						
4								

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

Page:_	1	_of_	1
Reviewer:	1	FT	

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:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Bromubenz-ene		100	93.058	93	93	U
Bromobenz-ene Hexacosanes	·	25	24.325	98	92	U

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	М	Benzo(e)Pyrene	s	1-Chloro-3-Nitrobenzene	Υ	Tetrachloro-m- xylene
В	4-Bromofluorobenzene (BFB)	н	Ortho-Terphenyl	N	Terphenyl-D14	т	3,4-Dinitrotoluene	z	2-Bromonaphthalene
C,	a,a,a-Trifluorotoluene	1	Fluorobenzene (FBZ)	0	Decachlorobiphenyl (DCB)	U	Tripentyltin	AA	Chloro-octadecane
D	Bromochlorobenene	J	n-Triacontane	Р	1-methylnaphthalene	V	Tri-n-propyltin	ВВ	2,4-Dichlorophenylacetic acid
E	1,4-Dichlorobutane	К	Hexacosane	Q	Dichlorophenyl Acetic Acid (DCAA)	W	Tributyl Phosphate	СС	2,5-Dibromotoluene
F	1,4-Difluorobenzene (DFB)	L	Bromobenzene	R	4-Nitrophenol	l x	Triphenyl Phosphate	<u> </u>	

LDC #:	52717	H8a
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VALIDATION FINDINGS WORKSHEFT

	VALIDATION FINDINGS WORKSHEET	Page: <u>1</u> ot <u>1</u>	
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:

%Recovery = 100 * (SSC/SA)

Where SSC = Spiked sample concentration

SA = Spike added

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

LCS = Laboratory Control Sample

LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples:

	Sp Add	ike	Spike Sample Concentration		LC	s	LC	SD	LCS/L	CSD
Compound	(mg	(L)	Concer (m	Lation	Percent Recovery		Percent Recovery		RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
TPH- Diesel Range	5.0	5.0	5-28	5.27	pb	106	105	105	_O	0
		-								

Comments: _			 	
		- 	 	

LDC #:	54	7/7/	-Xa
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VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	1	_of_	1	
Peviewer	F	- -		

METHOD:	GC _	_ HPLC

The co	oncentration of the sample wa	s calculated for the target analyte	identified below using the fol	llowing calculation:	
Concer	ntration= <u>(A)(Fv)(Df)</u> (RF)(Vs or Ws)(%S/100	Example:) Sample ID.	<u>#</u> /	Diesel Range	•
Fv= Fig Df= Di RF= Av In Vs= Ini Ws= Ini	ea or height of the target analyte to be nat Volume of extract lution Factor erage response factor of the target at the initial calibration tial volume of the sample tial weight of the sample ercent Solid	pe measured		5613183) (10) 26318:69795)(890 = 2.396	
#	Sample ID	Target analyte	Reported Concentrations (mg/L)	Recalculated Results Concentrations (mg ル)	Qualifications
	#1	Diesel Range	F7 -2.4 J.4	2.396	
Comme	nts:		L	L	L

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

September 26, 2022

Parameters:

Wet Chemistry

Validation Level:

Stage 2B

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C334

	Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
1	HU098	22C334-01	Water	03/24/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3 (2019), and the DoD General Validation Guidelines (November 2019). 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 methods:

Ferrous Iron by Standard Method 3500-Fe B Silica and Dissolved Silica by Standard Method 4500-SiO2 C

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.
- (Estimated, Bias Indeterminate): The analyte was analyzed for and positively J 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.
- Χ (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

- ICP Serial Dilution %D was not within control limits. а
- Presumed contamination from preparation (method blank). b
- Calibration %RSD, r, r², %D or %R was noncompliant. С
- The analysis with this flag should not be used because another more d technically sound analysis is available.
- MS/MSD or Duplicate RPD was high. е
- f Presumed contamination from FB or ER.
- ICP ICS results were unsatisfactory. g
- Holding times were exceeded. h
- i Internal standard performance was unsatisfactory.
- Estimated Maximum Possible Concentration (HRGC/HRMS only) k
- LCS/LCSD %R was not within control limits. 1
- Result exceeded the calibration range. m
- Cooler temperature or temperature blank was noncompliant and/or sample 0 custody problems.
- RPD between two columns was high (GC only). р
- MS/MSD recovery was not within control limits. q
- Surrogate recovery was not within control limits. S
- Presumed contamination from trip blank. t
- Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.
- LCS/LCSD RPD was high. W
- Chemical recovery was not within control limits (Radiochemistry only). У

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

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. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

The results for the dissolved sample analysis were greater than the total sample analysis as follows:

	Concentration (mg/L)		
Sample	Total Silica	Dissolved Silica	
HU098	30.7	41.1	

Raw data were not reviewed for Stage 2B validation.

XI. Overall Assessment of Data

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

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Data Qualification Summary - SDG 22C334

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 22C334

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Field Blank Data Qualification Summary - SDG 22C334

No Sample Data Qualified in this SDG

SDG#	: 54717l6 VALIDAT : 22C334 atory: EMAX Laboratories, Inc., Torran	5	ETENESS WORKSHE age 2B		Date: 9 22 Page: 1 of 1 Reviewer: 41
abora	atory. EIMAX Laboratories, Inc., Torrar	ice, CA		2nd	Reviewer:
IETH	OD: (Analyte) Ferrous Iron (SM3500-	-FE B), Silica	Dissolved Silica (SM4500-SIC	02 C)	
	imples listed below were reviewed for ion findings worksheets.	each of the t	lowing validation areas. Valid	ation findings are	noted in attache
_					
	Validation Area	1 1 1	Cor	nments	
l.	Sample receipt/Technical holding times	-A /A			
<u>II</u>	Initial calibration	<u> </u>			
III.	Calibration verification	<u> </u>			
IV	Laboratory Blanks	14		**************************************	
V	Field blanks	N N			
VI.	Matrix Spike/Matrix Spike Duplicates	A	From SDG # 22C337(HL	/104 MS/MSD)	<u>,22C287 (HUOG</u>
VII.	Duplicate sample analysis	<u> </u>		J DUP),	<u> </u>
VIII.	Laboratory control samples	<u> </u>	LCS/LCSD		
IX.	Field duplicates	N_			
Χ.	Target Analyte Quantitation	SWA			
ΧI	Overall assessment of data	<u> </u>			
ote:	N = Not provided/applicable R =	= No compound Rinsate = Field blank	detected D = Duplicate TB = Trip blank EB = Equipment b	OTHER	urce blank :
(Client ID		Lab ID	Matrix	Date
	1U098		22C334-01	Water	03/24/22
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Notes:_ LDC #: 54717 IC

VALIDATION FINDINGS WORKSHEET Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: 4TU

All circled methods are applicable to each sample.

Sample ID	Parameter
1	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC C16+ C104 (Fe27) (SiD2) (SiD2) (SiD2)
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS_CI_F_NO ₃ _NO ₂ _SO ₄ _O-PO ₄ _Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4

omments:

Page 1 of 1 Reviewer:

VALIDATION FINDINGS WORKSHEETS Target Analyte Quantitation

METHOD: Inorganics

Sample ID	Analyte	Total Result	Dissolved Result	Qualification	Det/ND
	1 SiO2	30.7	41.1	Text	
		T			

Comments:

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

August 17, 2022

Parameters:

Total Petroleum Hydrocarbons as Extractables

Validation Level:

Stage 2B

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C334

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU098	22C334-01	Water	03/24/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), 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

- ICP Serial Dilution %D was not within control limits.
- Presumed contamination from preparation (method blank). b
- Calibration %RSD, r, r², %D or %R was noncompliant. С
- The analysis with this flag should not be used because another more technically d sound analysis is available.
- MS/MSD or Duplicate RPD was high. е
- f Presumed contamination from FB or ER.
- ICP ICS results were unsatisfactory. g
- Holding times were exceeded. h
- i Internal standard performance was unsatisfactory.
- k Estimated Maximum Possible Concentration (HRGC/HRMS only)
- 1 LCS/LCSD %R was not within control limits.
- Result exceeded the calibration range. m
- Cooler temperature or temperature blank was noncompliant and/or sample 0 custody problems.
- RPD between two columns was high (GC only). р
- MS/MSD recovery was not within control limits. q
- Surrogate recovery was not within control limits. S
- Presumed contamination from trip blank.
- Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.
- LCS/LCSD RPD was high. W
- Chemical recovery was not within control limits (Radiochemistry only). ٧

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

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

No field duplicates were identified in this SDG.

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 Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary -**SDG 22C334**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data **Qualification Summary - SDG 22C334**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 22C334

No Sample Data Qualified in this SDG

SDG _abor MET H	#:22C334 atory: EMAX Laboratories, Inc., Torrance	S <u>e, CA</u> -846 Metho	tage 2B	SS WORKSHEI	2nd	Date: 8 17 Page: 1 of 1
	amples listed below were reviewed for eation findings worksheets.	ach of the fo	ollowing vali	dation areas. Valid	ation findings are	noted in attached
	Validation Area			Cor	nments	
l.	Sample receipt/Technical holding times	A/A				
II.	Initial calibration/ICV	A/Δ	0/v	PSO = 20	10 = 20	
111.	Continuing calibration ending	_A_		PSO = 20 CW = 20/2)	
IV.	Laboratory Blanks	<u>A</u>		į.		
V.	Field blanks	N				· · · · · · · · · · · · · · · · · · ·
VI.	Surrogate spikes	Δ				
VII.	Matrix spike/Matrix spike duplicates	N	L'J			
VIII.	Laboratory control samples	Δ	16517			
IX.	Field duplicates	N				
X.	Target analyte quantitation	N				
XI.	Target analyte identification	N				
XII	Overall assessment of data	_ A_			<u> </u>	
lote:	N = Not provided/applicable R = Rir	lo compounds nsate ield blank	s detected	D = Duplicate TB = Trip blank EB = Equipment I	OTHER:	rce blank
	Client ID	 		Lab ID	Matrix	Date
1	HU098			22C334-01	Water	03/24/22
2						
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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

September 26, 2022

Parameters:

Wet Chemistry

Validation Level:

Stage 2B

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C335

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU100	22C335-01	Water	03/24/22

Introduction

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The analyses were performed by the following methods:

Ferrous Iron by Standard Method 3500-Fe B Silica and Dissolved Silica by Standard Method 4500-SiO2 C

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

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- (Estimated, Low Bias): The analyte was analyzed for and positively identified by Jthe 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.
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- UJ (Non-detected estimated): The analyte was not detected and the associated numerical value is approximate.
- Χ (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.
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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

- ICP Serial Dilution %D was not within control limits. а
- Presumed contamination from preparation (method blank). b
- Calibration %RSD, r, r², %D or %R was noncompliant. С
- The analysis with this flag should not be used because another more d technically sound analysis is available.
- MS/MSD or Duplicate RPD was high. е
- f Presumed contamination from FB or ER.
- ICP ICS results were unsatisfactory. g
- h Holding times were exceeded.
- Internal standard performance was unsatisfactory. i
- Estimated Maximum Possible Concentration (HRGC/HRMS only) k
- LCS/LCSD %R was not within control limits. 1
- Result exceeded the calibration range. m
- Cooler temperature or temperature blank was noncompliant and/or sample 0 custody problems.
- RPD between two columns was high (GC only). р
- MS/MSD recovery was not within control limits. q
- Surrogate recovery was not within control limits.
- t Presumed contamination from trip blank.
- Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.
- LCS/LCSD RPD was high. W
- Chemical recovery was not within control limits (Radiochemistry only). У

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

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. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XI. Overall Assessment of Data

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

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Data Qualification Summary - SDG 22C335

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 22C335

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Field Blank Data Qualification Summary - SDG 22C335

No Sample Data Qualified in this SDG

SDG .abo	#:54717J6VALIDATION #:22C335 ratory: EMAX Laboratories, Inc., Torrand HOD: (Analyte) Ferrous Iron (SM3500-F	ce, CA	Stage 2B	S WORKSHE	2nd	Date: 9/22 Page: 1 of 1 Reviewer: 41 Reviewer: 7	27 - -
The s	samples listed below were reviewed for eation findings worksheets.				· · · · · · · · · · · · · · · · · · ·	noted in attache	- ed
	Validation Area			Co	mments]
1.	Sample receipt/Technical holding times	A A					╢
II	Initial calibration	A					
III.	Calibration verification	A					1
IV	Laboratory Blanks	A					1
V	Field blanks	1/				FM11	1
VI.	Matrix Spike/Matrix Spike Duplicates	Å	From SDG#	22C 337 (HUI	DUMSIMED) 2	2C287 (HU092	1
VII.		A		1 (1	DUP	1/ / 1/	
VIII.		A	USILO	G2		<u> </u>	1
IX.	Field duplicates	À	1 000/00				1
X.	Target Analyte Quantitation	N N					1
XI	Overall assessment of data	Ä					╢
lote:	N = Not provided/applicable $R = F$	No compound Rinsate Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipment	OTHER:	rce blank	_
	Client ID			Lab ID	Matrix	Date	
1	HU100			22C335-01	Water	03/24/22	
2							
3							
4							
5							┨
6							
7							
8							1
9							1
10							1
11							1
12							1
13							1
14							1
15							1

Notes:

LDC #: 54717JG

VALIDATION FINDINGS WORKSHEET Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: ATC

All circled methods are applicable to each sample.

Sample ID	Parameter
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC C16+ C104 (Fe2) (SiV2) (SIV2) DIS)
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
- "	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ CIO ₄
	PH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ AIK CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ AIK CN NH ₃ TKN TOC Cr6+ CIO ₄
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	PH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4

Comments:	 	 	 	<u> </u>	

Laboratory Data Consultants, Inc. **Data Validation Report**

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

August 17, 2022

Parameters:

Total Petroleum Hydrocarbons as Extractables

Validation Level:

Stage 2B

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C335

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU100	22C335-01	Water	03/24/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), 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.
- Χ (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)
- I 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

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

No field duplicates were identified in this SDG.

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 Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary -**SDG 22C335**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data **Qualification Summary - SDG 22C335**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 22C335

No Sample Data Qualified in this SDG

SDG abo MET The s	#: 54717J8a VALIDATI #: 22C335 ratory: EMAX Laboratories, Inc., Torran HOD: GC TPH as Extractables (EPA S) samples listed below were reviewed for a ation findings worksheets.	c <u>e, CA</u> W-846 Metho	Stage 2B od 8015C)	S WORKSHEE	I 2nd I	Date: \(\frac{1}{17} \) Page: \(\lambda \) Reviewer: \(\frac{1}{17} \)
	Validation Area			Com	ments	
ı.	Sample receipt/Technical holding times	A/Δ				
II.	Initial calibration/ICV	Δ/Δ	U/U 19	40/1W E2	J	
III.	Continuing calibration endin	۵		CW = 20)	w	
IV.	Laboratory Blanks	A				
V.	Field blanks	N				
VI.	Surrogate spikes	Δ				
VII.	Matrix spike/Matrix spike duplicates	N				
VIII	Laboratory control samples	Δ	us ID			
IX.	Field duplicates	N				
X.	Target analyte quantitation	N				
XI.	Target analyte identification	N				
ΧII	Overall assessment of data		<u> </u>			
Note:	A = Acceptable ND =	- Na				
	N = Not provided/applicable R = I	= No compound Rinsate : Field blank	ls detected	D = Duplicate TB = Trip blank EB = Equipment bla	OTHER:	rce blank
	N = Not provided/applicable R = I	Rinsate	s detected	TB = Trip blank	OTHER:	
1	N = Not provided/applicable R = SW = See worksheet FB =	Rinsate	ls detected	TB = Trip blank EB = Equipment bla	OTHER:	
1 2	N = Not provided/applicable R = SW = See worksheet FB =	Rinsate	ls detected	TB = Trip blank EB = Equipment bla	OTHER:	Date
	N = Not provided/applicable R = SW = See worksheet FB =	Rinsate	ls detected	TB = Trip blank EB = Equipment bla	OTHER:	Date
2	N = Not provided/applicable R = SW = See worksheet FB =	Rinsate	Is detected	TB = Trip blank EB = Equipment bla	OTHER:	Date
2 3 4	N = Not provided/applicable R = SW = See worksheet FB =	Rinsate	Is detected	TB = Trip blank EB = Equipment bla	OTHER:	Date
3	N = Not provided/applicable R = SW = See worksheet FB =	Rinsate	Is detected	TB = Trip blank EB = Equipment bla	OTHER:	Date
2 3 4 5	N = Not provided/applicable R = SW = See worksheet FB =	Rinsate	Is detected	TB = Trip blank EB = Equipment bla	OTHER:	Date
2 3 4 5	N = Not provided/applicable R = SW = See worksheet FB =	Rinsate	Is detected	TB = Trip blank EB = Equipment bla	OTHER:	Date
2 3 4 5 6 7 8	N = Not provided/applicable R = SW = See worksheet FB =	Rinsate	Is detected	TB = Trip blank EB = Equipment bla	OTHER:	Date
2 3 4 5 6 7 8	N = Not provided/applicable R = SW = See worksheet FB =	Rinsate	Is detected	TB = Trip blank EB = Equipment bla	OTHER:	Date
2 3 4 5 6 7 8 9	N = Not provided/applicable R = SW = See worksheet FB =	Rinsate	ls detected	TB = Trip blank EB = Equipment bla	OTHER:	Date
2 3 4 5 6	N = Not provided/applicable R = SW = See worksheet FB =	Rinsate	Is detected	TB = Trip blank EB = Equipment bla	OTHER:	Date
2 3 4 5 6 7 8 9 10 11 12	N = Not provided/applicable R = SW = See worksheet FB = Client ID HU100	Rinsate	Is detected	TB = Trip blank EB = Equipment bla	OTHER:	Date
2 3 4 5 6 7 8 9 10 11 12	N = Not provided/applicable SW = See worksheet FB =	Rinsate	Is detected	TB = Trip blank EB = Equipment bla	OTHER:	Date
2 3 4 5 6 7 8 9 10 11	N = Not provided/applicable R = SW = See worksheet FB = Client ID HU100	Rinsate	Is detected	TB = Trip blank EB = Equipment bla	OTHER:	Date

Laboratory Data Consultants, Inc. **Data Validation Report**

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

September 26, 2022

Parameters:

Wet Chemistry

Validation Level:

Stage 2B

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C336

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU102	22C336-01	Water	03/24/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3 (2019), and the DoD General Validation Guidelines (November 2019). 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 methods:

Ferrous Iron by Standard Method 3500-Fe B Silica and Dissolved Silica by Standard Method 4500-SiO2 C

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.
- (Estimated, Low Bias): The analyte was analyzed for and positively identified by Jthe laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.
- (Estimated, Bias Indeterminate): The analyte was analyzed for and positively J 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.
- Χ (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

- ICP Serial Dilution %D was not within control limits. а
- b Presumed contamination from preparation (method blank).
- С Calibration %RSD, r, r², %D or %R was noncompliant.
- The analysis with this flag should not be used because another more d technically sound analysis is available.
- MS/MSD or Duplicate RPD was high. е
- f Presumed contamination from FB or ER.
- ICP ICS results were unsatisfactory.
- h Holding times were exceeded.
- i Internal standard performance was unsatisfactory.
- Estimated Maximum Possible Concentration (HRGC/HRMS only) k
- Т LCS/LCSD %R was not within control limits.
- Result exceeded the calibration range. m
- Cooler temperature or temperature blank was noncompliant and/or sample custody problems.
- RPD between two columns was high (GC only). р
- MS/MSD recovery was not within control limits. q
- Surrogate recovery was not within control limits.
- Presumed contamination from trip blank. t
- Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.
- LCS/LCSD RPD was high. W
- Chemical recovery was not within control limits (Radiochemistry only). ٧

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

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. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XI. Overall Assessment of Data

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

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Data Qualification Summary - SDG 22C336

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 22C336

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Field Blank Data Qualification Summary - SDG 22C336

No Sample Data Qualified in this SDG

VALIDATION COMPLETENESS WORKSHEET LDC #: 54717K6 Stage 2B SDG #: 22C336 Laboratory: EMAX Laboratories, Inc., Torrance, CA Reviewer: -AT 2nd Reviewer: / METHOD: (Analyte) Ferrous Iron (SM3500-FE B), Silica, Dissolved Silica (SM4500-SIO2 C) The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets. **Comments** Validation Area Sample receipt/Technical holding times Ш Initial calibration III. Calibration verification IV Laboratory Blanks Field blanks VI. Matrix Spike/Matrix Spike Duplicates VII. Duplicate sample analysis VIII. Laboratory control samples Field duplicates IX. X. **Target Analyte Quantitation** Ν Overall assessment of data Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank N = Not provided/applicable R = Rinsate TB = Trip blank OTHER: SW = See worksheet FB = Field blank EB = Equipment blank **Client ID** Lab ID Matrix Date HU102 22C336-01 Water 03/24/22 3 4 5 6

9 10 11 LDC #: 54717KC

VALIDATION FINDINGS WORKSHEET Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: ATC

All circled methods are applicable to each sample.

Sample ID	Parameter
	PH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC C16+ C104 (Fe ²⁺) (SID2) (SID2 DIS)
•	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
_	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
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	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
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	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	DH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	DH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	PH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	DH TDS CLE NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4

Comments:_____

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

August 17, 2022

Parameters:

Total Petroleum Hydrocarbons as Extractables

Validation Level:

Stage 2B

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C336

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU102	22C336-01	Water	03/24/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), 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

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- 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.
- Χ (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.
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Qualification Code Reference

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- Presumed contamination from preparation (method blank). b
- Calibration %RSD, r, r², %D or %R was noncompliant. С
- d The analysis with this flag should not be used because another more technically sound analysis is available.
- MS/MSD or Duplicate RPD was high. е
- 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)
- LCS/LCSD %R was not within control limits.
- Result exceeded the calibration range. m
- Cooler temperature or temperature blank was noncompliant and/or sample 0 custody problems.
- RPD between two columns was high (GC only). p
- MS/MSD recovery was not within control limits. q
- Surrogate recovery was not within control limits. S
- Presumed contamination from trip blank. t
- Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.
- LCS/LCSD RPD was high. W
- Chemical recovery was not within control limits (Radiochemistry only). У

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

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

No field duplicates were identified in this SDG.

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 Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary -**SDG 22C336**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data **Qualification Summary - SDG 22C336**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 22C336

No Sample Data Qualified in this SDG

SDG # Labor	#: 54717K8a VALIDATIO #: 22C336 atory: EMAX Laboratories, Inc., Torrance IOD: GC TPH as Extractables (EPA SW	S <u>e, CA</u>	stage 2B	S WORKSHEET		Date: \$\frac{\mathbb{g}}{17}\] Page:of viewer:
The s	amples listed below were reviewed for eation findings worksheets.		•	ation areas. Validatio	on findings are no	ted in attached
	Validation Area			Comm	ents	
l.	Sample receipt/Technical holding times	AIA	-			
II.	Initial calibration/ICV	AIA	% 000	12 20 10	1570	
III.	Continuing calibration	Δ		CW 4 20		
IV.	Laboratory Blanks	A				
V.	Field blanks	2				
VI.	Surrogate spikes	À				
VII.	Matrix spike/Matrix spike duplicates	7	cz			
VIII.	Laboratory control samples	0	ics17			
IX.	Field duplicates	N				
X.	Target analyte quantitation	N				
XI.	Target analyte identification	N				
XII	Overall assessment of data					
Note:	N = Not provided/applicable R = Rir	No compounds nsate field blank	s detected	D = Duplicate TB = Trip blank EB = Equipment blar	SB=Source OTHER: k	blank
	Client ID			Lab ID	Matrix	Date
	Client ID HU102			22C336-01	Water	Date 03/24/22
1						
1 2						
2 3						
1 2 3 4						
1 2 3 4 5						
1 2 3 4 5 6						
1 2 3 4 5 6 7						
1 2 3 4 5 6 7 8						
1 2 3 4 5 6 7 8 9						
1 2 3 4 5 6 7 8 9						
1 2 3 4 5 6 7 8 9 10						
1 2 3 4 5 6 7 8 9 10 11						
1 2 3 4 5 6 7 8 9 10 11 12						
1 2 3 4 5 6 7 8 9 10 11 12	HU102					

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

September 26, 2022

Parameters:

Wet Chemistry

Validation Level:

Stage 2B

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C337

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU104	22C337-01	Water	03/24/22
HU104MS	22C337-01MS	Water	03/24/22
HU104MSD	22C337-01MSD	Water	03/24/22
HU104DUP	22C337-01DUP	Water	03/24/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3 (2019), and the DoD General Validation Guidelines (November 2019). 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 methods:

Ferrous Iron by Standard Method 3500-Fe B Silica and Dissolved Silica by Standard Method 4500-SiO2 C

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.
- (Estimated, Low Bias): The analyte was analyzed for and positively identified by Jthe 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.
- Χ (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

- ICP Serial Dilution %D was not within control limits. а
- b Presumed contamination from preparation (method blank).
- Calibration %RSD, r, r², %D or %R was noncompliant. С
- d The analysis with this flag should not be used because another more technically sound analysis is available.
- MS/MSD or Duplicate RPD was high. е
- f Presumed contamination from FB or ER.
- ICP ICS results were unsatisfactory. g
- h Holding times were exceeded.
- i Internal standard performance was unsatisfactory.
- k Estimated Maximum Possible Concentration (HRGC/HRMS only)
- LCS/LCSD %R was not within control limits.
- Result exceeded the calibration range. m
- Cooler temperature or temperature blank was noncompliant and/or sample 0 custody problems.
- RPD between two columns was high (GC only). р
- MS/MSD recovery was not within control limits. q
- s Surrogate recovery was not within control limits.
- t Presumed contamination from trip blank.
- Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.
- LCS/LCSD RPD was high. W
- Chemical recovery was not within control limits (Radiochemistry only). У

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

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. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XI. Overall Assessment of Data

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

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Data Qualification Summary - SDG 22C337

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 22C337

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Field Blank Data Qualification Summary - SDG 22C337

No Sample Data Qualified in this SDG

LDC #: 54717L6 VALIDATION COMPLETENESS WORKSHEET SDG #: 22C337 Stage 2B Laboratory: EMAX Laboratories, Inc., Torrance, CA METHOD: (Analyte) Ferrous Iron (SM3500-FE B), Silica, Dissolved Silica (SM4500-SIO2 C) 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
Ι	Sample receipt/Technical holding times	AIA	
П	Initial calibration	A	
Ш.	Calibration verification	A	
IV	Laboratory Blanks	A	
>	Field blanks	N_{-}	
VI.	Matrix Spike/Matrix Spike Duplicates	A	(213), From 22C287 (HUO9ZMS/MSD)
VII.	Duplicate sample analysis	A	4 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
VIII.	Laboratory control samples	A	LCS I LCSD
IX.	Field duplicates	N_	
X.	Target Analyte Quantitation	N	·
ΧI	Overall assessment of data	A	

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	HU104	22C337-01	Water	03/24/22
2	HU104MS	22C337-01MS	Water	03/24/22
3	HU104MSD	22C337-01MSD	Water	03/24/22
4	HU104DUP	22C337-01DUP	Water	03/24/22
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15_				

Notes:			 		
				·	
	-	 			

LDC #: 54717 LC

VALIDATION FINDINGS WORKSHEET Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: ATC

All circled methods are applicable to each sample.

Sample ID	Parameter
	ph tds ci f no, no, so, o-po, aik cn nh, tkn toc cr6+ cio, (Fe2+) (3102) (S102 DS)
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
QC	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
2,3,4	pH TDS CI F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
	ph TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	PH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO $_3$ NO $_2$ SO $_4$ O-PO $_4$ Alk CN NH $_3$ TKN TOC Cr6+ ClO $_4$
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4

Comments:

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

October 6, 2022

Parameters:

Total Petroleum Hydrocarbons as Extractables

Validation Level:

Stage 2B

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C337

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU104	22C337-01	Water	03/24/22
HU104(SGCU)	22C337-01(SGCU)	Water	03/24/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), 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.
- Χ (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)
- I LCS/LCSD %R was not within control limits.
- m Result exceeded the calibration range.
- 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

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

No field duplicates were identified in this SDG.

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 Oily Waste Disposal Facility, CTO 18F0176

Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG 22C337

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176

Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data

Qualification Summary - SDG 22C337

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176
Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification
Summary - SDG 22C337

No Sample Data Qualified in this SDG

The s	HOD: GC TPH as Extracta samples listed below were ation findings worksheets.	·		•	lation areas. Valida	tion findings are	noted in attached
Valla	T		T				
<u> </u>	Validation A	Area			Com	ments	
<u>l.</u>	Sample receipt/Technical hol	ding times	AIA	·			
11.	Initial calibration/ICV		40	% PS	D/14=20		
111.	Continuing calibration en	ding			CIVENIN	J	
IV.	Laboratory Blanks	•	Δ_				*****
V.	Field blanks		N				
VI.	Surrogate spikes		Δ_				
VII.	Matrix spike/Matrix spike dup	licates	N				
VIII.	Laboratory control samples		A	Les 10			
IX.	Field duplicates		N				
X.	Target analyte quantitation		N				
XI.	Target analyte identification		N				
XII	Overall assessment of data		<u> </u>				-
Note:	A = Acceptable N = Not provided/applicable SW = See worksheet	R≖I	No compounds Rinsate Field blank	detected	D = Duplicate TB = Trip blank EB = Equipment bl	SB=Sourd OTHER: ank	ce blank
	Client ID				Lab ID	B. Anton	
. 4					Lab ib	Matrix	Date
1+	HU104				22C337-01	Water	03/24/22
	HU104						
2	HU104						
	HU104						
3	HU104						
3	HU104						
2 3 4 5	HU104						
2 3 4 5	HU104						
2 3 4 5 6 7	HU104						
2 3 4 5 6 7 8	HU104						
2 3 4 5 6 7 8	HU104						
2 3 4 5 6 7 8 9 10	HU104						
2 3 4 5 6 7 8 9	HU104						
2 3 4 5 6 7 8 9 10 11 12	HU104						
2 3 4 5 6 7 8 9 10 11	MBIKIW						
2 3 4 5 6 7 8 9 10 11 12							
2 3 4 5 6 7 8 9 10 11 12							

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Reviewer: 2nd Reviewer:

LDC #: 54717L8a

Laboratory: EMAX Laboratories, Inc., Torrance, CA

SDG #: 22C337

Laboratory Data Consultants, Inc. **Data Validation Report**

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

September 26, 2022

Parameters:

Wet Chemistry

Validation Level:

Stage 2B

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C352

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU094	22C352-01	Water	03/28/22
HU094MS	22C352-01MS	Water	03/28/22
HU094MSD	22C352-01MSD	Water	03/28/22
HU094DUP	22C352-01DUP	Water	03/28/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3 (2019), and the DoD General Validation Guidelines (November 2019). 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 methods:

Ferrous Iron by Standard Method 3500-Fe B Silica and Dissolved Silica by Standard Method 4500-SiO2 C

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.
- Χ (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

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

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

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. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XI. Overall Assessment of Data

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

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Data Qualification Summary - SDG 22C352

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 22C352

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Wet Chemistry - Field Blank Data Qualification Summary - SDG 22C352

No Sample Data Qualified in this SDG

	#: <u>54717M6</u> VALIDATIO #: <u>22C352</u> atory: <u>EMAX Laboratories, Inc., Torrance</u>	S	PLETENESS Stage 2B	S WORKSHEET		Date: <u>4 21 </u> 2 Page: <u> </u> of Reviewer: <u>A</u> Reviewer: <u></u>
METH	HOD: (Analyte) Ferrous Iron (SM3500-FE	B), Silica	, Dissolved Sili	ca (SM4500-SIO2	<u>C)</u>	
	amples listed below were reviewed for eation findings worksheets.	ach of the f	ollowing valida	tion areas. Validati	on findings are	noted in attached
	Validation Area			Comr	nents	
I.	Sample receipt/Technical holding times	AIA				
II	Initial calibration	A				
Ш.	Calibration verification	A				
IV	Laboratory Blanks	A				
٧	Field blanks	N_				
VI.	Matrix Spike/Matrix Spike Duplicates	A	(2,3)			
VII.	Duplicate sample analysis	A	4			
VIII.	Laboratory control samples	A	LCSILCS	2		
IX.	Field duplicates	N				
X.	Target Analyte Quantitation	N				
ΧI	Overall assessment of data	A				
Note:	N = Not provided/applicable R = Rin	lo compound nsate ield blank	s detected	D = Duplicate TB = Trip blank EB = Equipment bla	OTHER	irce blank :
	Client ID			Lab ID	Matrix	Date
1	HU094			22C352-01	Water	03/28/22
2	HU094MS			22C352-01MS	Water	03/28/22
3	HU094MSD			22C352-01MSD	Water	03/28/22
4	HU094DUP			22C352-01DUP	Water	03/28/22
5						
6						
7						
8						
9						
10						
11						
12						
13						
						

Notes:_

LDC #: 54717MG

VALIDATION FINDINGS WORKSHEET Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: ATC

All circled methods are applicable to each sample.

Sample ID	Parameter
1	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC C16+ C104(Fe ²⁷) (SiÚZ) (SiÚZ) (SiÚZ)
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ AIK CN NH ₃ TKN TOC Cr6+ CIO ₄
00	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4
2,3,4	PH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC C16+ C104 (Felt) (SiD2 Dis)
, , ,	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO $_3$ NO $_2$ SO $_4$ O-PO $_4$ Alk CN NH $_3$ TKN TOC Cr6+ ClO $_4$
	pH TDS CI F NO $_3$ NO $_2$ SO $_4$ O-PO $_4$ AIk CN NH $_3$ TKN TOC Cr6+ CIO $_4$
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CI F NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ CIO4
	pH TDS CLF NO3 NO2 SO4 O-PO4 AIK CN NH3 TKN TOC Cr6+ ClO4

Comments:

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

August 17, 2022

Parameters:

Total Petroleum Hydrocarbons as Extractables

Validation Level:

Stage 2B

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C352

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
HU094	22C352-01	Water	03/28/22
HU094(SGCU)	22C352-01(SGCU)	Water	03/28/22

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 Final Site Assessment Work Plan, Red Hill Oily Waste Disposal Facility, Pearl Harbor HI FISC Site 22, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (February 2021), 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:

- (Estimated, High Bias): The analyte was analyzed for and positively identified by J+ 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.
- Χ (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

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

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

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

No field duplicates were identified in this SDG.

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 Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary -**SDG 22C352**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data **Qualification Summary - SDG 22C352**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 22C352

No Sample Data Qualified in this SDG

SDG #	#: 54717M8a VALIDATIO #: 22C352 atory: EMAX Laboratories, Inc., Torrance	S	PLETENESS Stage 2B	S WORKSHEET	Ro 2nd Po	Date: 4 1/22 Page:of eviewer:eviewer:
METH	IOD: GC TPH as Extractables (EPA SW	-846 Metho	od 8015C)		ZHU N	eviewei
	amples listed below were reviewed for eation findings worksheets.	ch of the f	ollowing valida	ation areas. Validatio	n findings are n	oted in attached
	Validation Area			Comme	ents	
l.	Sample receipt/Technical holding times	AA				
II.	Initial calibration/ICV	A/A	0 PSD	116V E20		
III.	Continuing calibration entire	A		1 164 =20 CW = 20/20		
IV.	Laboratory Blanks	A				
V.	Field blanks	N				
VI.	Surrogate spikes	A				
VII.	Matrix spike/Matrix spike duplicates	N				
VIII.	Laboratory control samples	Α	Les 10			
IX.	Field duplicates	N	, ,			
X.	Target analyte quantitation	N				
XI.	Target analyte identification	N				
XII	Overall assessment of data					
Note:	N = Not provided/applicable R = Rin	o compound sate eld blank	s detected	D = Duplicate TB = Trip blank EB = Equipment blank	SB=Sourc OTHER:	e blank
+	Client ID			Lab ID	Matrix	Date
1	1 11 10 0 4				i	
	HU094			22C352-01	Water	03/28/22
2 [†]	HU094(SGCU)				Water	
3				22C352-01		03/28/22
3 4				22C352-01		03/28/22
3 4 5				22C352-01		03/28/22
3 4 5 6				22C352-01		03/28/22
3 4 5 6 7				22C352-01		03/28/22
3 4 5 6 7 8				22C352-01		03/28/22
3 4 5 6 7 8 9				22C352-01		03/28/22
3 4 5 6 7 8 9				22C352-01		03/28/22
3 4 5 6 7 8 9 10				22C352-01		03/28/22
3 4 5 6 7 8 9 10 11				22C352-01		03/28/22
3 4 5 6 7 8 9 10				22C352-01		03/28/22
3 4 5 6 7 8 9 10 11 12 13 lotes:	HU094(SGCU)			22C352-01		03/28/22
3 4 5 6 7 8 9 10 11 12 13 Notes:	HU094(SGCU)			22C352-01		03/28/22
3 4 5 6 7 8 9 10 11 12 13 Notes:	HU094(SGCU)			22C352-01		03/28/22

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Red Hill Oily Waste Disposal Facility, CTO 18F0176

LDC Report Date:

August 17, 2022

Parameters:

Total Petroleum Hydrocarbons as Extractables

Validation Level:

Stage 2B

Laboratory:

EMAX Laboratories, Inc., Torrance, CA

Sample Delivery Group (SDG): 22C355

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date	
HU105	22C355-01	Water	03/28/22	

Introduction

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- b Presumed contamination from preparation (method blank).
- Calibration %RSD, r, r², %D or %R was noncompliant. С
- d The analysis with this flag should not be used because another more technically sound analysis is available.
- е MS/MSD or Duplicate RPD was high.
- f Presumed contamination from FB or ER.
- ICP ICS results were unsatisfactory. g
- Holding times were exceeded. h
- i Internal standard performance was unsatisfactory.
- k Estimated Maximum Possible Concentration (HRGC/HRMS only)
- ı LCS/LCSD %R was not within control limits.
- Result exceeded the calibration range. m
- Cooler temperature or temperature blank was noncompliant and/or sample 0 custody problems.
- RPD between two columns was high (GC only). р
- MS/MSD recovery was not within control limits. q
- Surrogate recovery was not within control limits. s
- Presumed contamination from trip blank. t
- Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.
- LCS/LCSD RPD was high. W
- Chemical recovery was not within control limits (Radiochemistry only). У

I. Sample Receipt and Technical Holding Times

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

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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.

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V. Field Blanks

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VI. Surrogates

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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 Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary -**SDG 22C355**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data **Qualification Summary - SDG 22C355**

No Sample Data Qualified in this SDG

Red Hill Oily Waste Disposal Facility, CTO 18F0176 Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 22C355

No Sample Data Qualified in this SDG

METHOD: GC TPH as Extractables (EPA SW-846 Method 8015C)										
	camples listed below were reviewed for ation findings worksheets.	each of the fo	ollowing va	alidation ar	reas. Validatio	n findings are not	ed in attache			
	Validation Area		Comments							
I.	Sample receipt/Technical holding times	A/A	4							
II.	Initial calibration/ICV	AIA	% BD/14/20							
111.	Continuing calibration ending		(0 PSD/10/E20) COV = 20/W							
IV.	Laboratory Blanks	4								
V.	Field blanks	N		··						
VI.	Surrogate spikes	<u> </u>								
VII.	Matrix spike/Matrix spike duplicates	N								
VIII.	Laboratory control samples	A	us 10							
IX.	Field duplicates	_ N								
X.	Target analyte quantitation	N				······				
XI.	Target analyte identification	N								
LXIL	Overall assessment of data	Δ								
Note:	: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank N = Not provided/applicable R = Rinsate TB = Trip blank OTHER: SW = See worksheet FB = Field blank EB = Equipment blank									
	Client ID			Lab II)	Matrix	Date			
1 2	HU105			22C35	55-01	Water	03/28/22			
2										
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6										
6 7 8 9										
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Notes:			· I I							
-	MBrkin									
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VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date:_ Page:_

Reviewer:

LDC #: 54717N8a

Laboratory: EMAX Laboratories, Inc., Torrance, CA

SDG #: 22C355