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

March 9, 2022

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

Dear Ms. Ramos,

Enclosed is the final validation report for the fraction listed below. This SDG was received on November 12, 2021. Attachment 1 is a summary of the samples that were reviewed for analysis.

LDC Project #52646A:

SDG #	Fraction
97541	Volatiles, Polynuclear Aromatic Hydrocarbons, Gasoline Range Organics, 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 method:

- Work Plan/Scope of Work, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor - Hickam, O'ahu, Hawai'i (Revision 02, January 2017)
- Sampling and Analysis Plan, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor - Hickam, O'ahu, Hawai'i (Revision 01, April 2017)
- Sampling and Analysis Plan, Addendum 01, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 00, September 2017)
- Sampling and Analysis Plan, Addendum 03, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 00, June 2018)
- U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3 (2019)
- DoD General Validation Guidelines (November 2019)
- U.S. Department of Defense (DoD) Data Validation Guidelines Module 1: Data Validation Procedure for Organic Analysis by GC/MS (May 2020)
- 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

262 pages-DL

Attachment 1

90/10 2B/4 EDD

LDC# 52646 (AECOM - Honolulu, HI / Red Hill Bulk Storage Facility, CTO 18F0126)

LDC	SDG#	DATE REC'D	(2) DATE DUE	BTEX (8260B)		(3)PAHs (8270D -SIM)		GRO (8260B)		TPH-E (8015B)		SGCU TPH-E (8015B)		TOC (9060A)																			
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
A	97541	11/12/21	11/30/21	9	0	5	0	9	0	5	0	5	0	-	-																		
B	97717	11/12/21	11/30/21	2	0	1	0	2	0	1	0	1	0	1	0																		
B	97717	11/12/21	11/30/21	2	0	2	0	2	0	2	0	2	0	1	0																		
C	97833	11/12/21	11/30/21	5	0	4	0	5	0	3	0	3	0	2	0																		
Total	T/SC			18	0	12	0	18	0	11	0	11	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	74

Shaded cells indicate Stage 4 validation (all other cells are Stage 2B validation). These sample counts do not include MS/MSD, and DUPs

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Laboratory Data Consultants, Inc.
Data Validation Report

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

LDC Report Date: November 30, 2021

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: APPL, Inc., Clovis, CA

Sample Delivery Group (SDG): 97541

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
ERH1661	BA40883	Water	09/15/21
ERH1662	BA40884	Water	09/15/21
ERH1663	BA40885	Water	09/15/21
ERH1664	BA40886	Water	09/15/21
ERH1665	BA40887	Water	09/15/21
ERH1666	BA40888	Water	09/15/21
ERH1667	BA40889	Water	09/15/21
ERH1668	BA40890	Water	09/15/21
ERH1669	BA40891	Water	09/15/21

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Work Plan/Scope of Work, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 02, January 2017), the Sampling and Analysis Plan, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 01, April 2017), the Sampling and Analysis Plan, Addendum 01, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 00, September 2017), the Sampling and Analysis Plan, Addendum 03, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 00, June 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3 (2019), the DoD General Validation Guidelines (November 2019), and the U.S. Department of Defense (DoD) Data Validation Guidelines Module 1: Data Validation Procedure for Organic Analysis by GC/MS (May 2020). 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:

Volatile Organic Compounds (VOCs) which are Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) by Environmental Protection Agency (EPA) SW 846 Method 8260B

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

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

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

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

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

U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The analyte was not detected and the associated numerical value is approximate.

X (Exclusion of data recommended): The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Exclusion of the data is recommended.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Code Reference

a ICP Serial Dilution %D was not within control limits.

b Presumed contamination from preparation (method blank).

c Calibration %RSD, r, r^2, %D or %R was noncompliant.

d The analysis with this flag should not be used because another more technically sound analysis is available.

e MS/MSD or Duplicate RPD was high.

f Presumed contamination from FB or ER.

g ICP ICS results were unsatisfactory.

h Holding times were exceeded.

i Internal standard performance was unsatisfactory.

k Estimated Maximum Possible Concentration (HRGC/HRMS only)

l LCS/LCSD %R was not within control limits.

m Result exceeded the calibration range.

o Cooler temperature or temperature blank was noncompliant and/or sample custody problems.

p RPD between two columns was high (GC only).

q MS/MSD recovery was not within control limits.

s Surrogate recovery was not within control limits.

t Presumed contamination from trip blank.

v Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

w LCS/LCSD RPD was high.

y Chemical recovery was not within control limits (Radiochemistry only).

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For analytes where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 15.0%.

In the case where the laboratory used a calibration curve to evaluate the analytes, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all analytes were within validation criteria.

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

IV. 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 50.0% for all analytes.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

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

VI. Field Blanks

Samples ERH1661, ERH1663, ERH1665, and ERH1667 were identified as trip blanks. No contaminants were found.

VII. Surrogates

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

VIII. 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.

IX. 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.

X. Field Duplicates

Samples ERH1662 and ERH1669 were identified as field duplicates. No results were detected in any of the samples.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Analyte Identification

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

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

Red Hill Bulk Storage Facility, CTO 18F0126
Volatiles - Data Qualification Summary - SDG 97541

No Sample Data Qualified in this SDG

Red Hill Bulk Storage Facility, CTO 18F0126
Volatiles - Laboratory Blank Data Qualification Summary - SDG 97541

No Sample Data Qualified in this SDG

Red Hill Bulk Storage Facility, CTO 18F0126
Volatiles - Field Blank Data Qualification Summary - SDG 97541

No Sample Data Qualified in this SDG

LDC #: 52646A1a

SDG #: 97541

Laboratory: APPL, Inc., Clovis, CA

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 11/28/21

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (BTEX)(EPA SW 846 Method 8260B)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	%D RSD ≤ 15, r² ICV ≤ 20
IV.	Continuing calibration / ending	A	CCV ≤ 20/50
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	TB = 1, 3, 5, 7
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	CS
IX.	Laboratory control samples	A	LCS ID
X.	Field duplicates	ND	D = 2, 9
XI.	Internal standards	A	
XII.	Target analyte quantitation	N	
XIII.	Target analyte identification	N	
XIV.	System performance	N	
XV.	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	ERH1661	TB	BA40883	Water	09/15/21
2	ERH1662	D	BA40884	Water	09/15/21
3	ERH1663	TB	BA40885	Water	09/15/21
4	ERH1664		BA40886	Water	09/15/21
5	ERH1665	TB	BA40887	Water	09/15/21
6	ERH1666		BA40888	Water	09/15/21
7	ERH1667	TB	BA40889	Water	09/15/21
8	ERH1668		BA40890	Water	09/15/21
9	ERH1669	D	BA40891	Water	09/15/21
10					

Notes:

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Laboratory Data Consultants, Inc.
Data Validation Report

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

LDC Report Date: November 30, 2021

Parameters: Polynuclear Aromatic Hydrocarbons

Validation Level: Stage 2B

Laboratory: APPL, Inc., Clovis, CA

Sample Delivery Group (SDG): 97541

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
ERH1662	BA40884	Water	09/15/21
ERH1664	BA40886	Water	09/15/21
ERH1666	BA40888	Water	09/15/21
ERH1668	BA40890	Water	09/15/21
ERH1669	BA40891	Water	09/15/21

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Work Plan/Scope of Work, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 02, January 2017), the Sampling and Analysis Plan, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 01, April 2017), the Sampling and Analysis Plan, Addendum 01, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 00, September 2017), the Sampling and Analysis Plan, Addendum 03, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (Revision 00, June 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3 (2019), the DoD General Validation Guidelines (November 2019), and the U.S. Department of Defense (DoD) Data Validation Guidelines Module 1: Data Validation Procedure for Organic Analysis by GC/MS (May 2020). 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:

Polynuclear Aromatic Hydrocarbons (PAHs) which are 1-Methylnaphthalene, 2-Methylnaphthalene, and Naphthalene by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

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

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

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

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

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

U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The analyte was not detected and the associated numerical value is approximate.

X (Exclusion of data recommended): The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Exclusion of the data is recommended.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Code Reference

a ICP Serial Dilution %D was not within control limits.

b Presumed contamination from preparation (method blank).

c Calibration %RSD, r, r^2, %D or %R was noncompliant.

d The analysis with this flag should not be used because another more technically sound analysis is available.

e MS/MSD or Duplicate RPD was high.

f Presumed contamination from FB or ER.

g ICP ICS results were unsatisfactory.

h Holding times were exceeded.

i Internal standard performance was unsatisfactory.

k Estimated Maximum Possible Concentration (HRGC/HRMS only)

l LCS/LCSD %R was not within control limits.

m Result exceeded the calibration range.

o Cooler temperature or temperature blank was noncompliant and/or sample custody problems.

p RPD between two columns was high (GC only).

q MS/MSD recovery was not within control limits.

s Surrogate recovery was not within control limits.

t Presumed contamination from trip blank.

v Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

w LCS/LCSD RPD was high.

y Chemical recovery was not within control limits (Radiochemistry only).

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. 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 15.0% for all analytes.

Average relative response factors (RRF) for all analytes were within validation criteria.

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

IV. 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 50.0% for all analytes.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

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

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

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

VIII. 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.

IX. 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.

X. Field Duplicates

Samples ERH1662 and ERH1669 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD (Limits)	Flag	A or P
	ERH1662	ERH1669			
1-Methylnaphthalene	0.19	0.21	10 (≤50)	-	-

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Analyte Identification

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

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

Red Hill Bulk Storage Facility, CTO 18F0126
Polynuclear Aromatic Hydrocarbons - Data Qualification Summary - SDG 97541

No Sample Data Qualified in this SDG

Red Hill Bulk Storage Facility, CTO 18F0126
Polynuclear Aromatic Hydrocarbons - Laboratory Blank Data Qualification Summary - SDG 97541

No Sample Data Qualified in this SDG

Red Hill Bulk Storage Facility, CTO 18F0126
Polynuclear Aromatic Hydrocarbons - Field Blank Data Qualification Summary - SDG 97541

No Sample Data Qualified in this SDG

LDC #: 52646A2b
SDG #: 97541
Laboratory: APPL, Inc., Clovis, CA

VALIDATION COMPLETENESS WORKSHEET
Stage 2B

Date: 11/28/21
Page: 1 of 1
Reviewer: KJ
2nd Reviewer: [illegible]

METHOD: GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW846 Method 8270D-SIM)
TTT, W, S

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	%RSD ≤ 15 ICV ≤ 20
IV.	Continuing calibration pending	A	CCV ≤ 20/50
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	c>
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	SW	D = 1, 5
XI.	Internal standards	A	
XII.	Target analyte quantitation	N	
XIII.	Target analyte identification	N	
XIV.	System performance	N	
XV.	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*	ERH1662	D	BA40884	Water	09/15/21
2+	ERH1664		BA40886	Water	09/15/21
3-	ERH1666		BA40888	Water	09/15/21
4-	ERH1668		BA40890	Water	09/15/21
5+	ERH1669	D	BA40891	Water	09/15/21
6					
7					
8					
9					

Notes:

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VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS SVOA

A. Phenol	CC. Dimethylphthalate	EEE. Bis(2-ethylhexyl)phthalate	GGGG. C30-Hopane	I1. Methyl methanesulfonate
B. Bis (2-chloroethyl) ether	DD. Acenaphthylene	FFF. Di-n-octylphthalate	HHHH. 1-Methylphenanthrene	J1. Ethyl methanesulfonate
C. 2-Chlorophenol	EE. 2,6-Dinitrotoluene	GGG. Benzo(b)fluoranthene	IIII. 1,4-Dioxane	K1. o,o',o''-Triethylphosphorothioate
D. 1,3-Dichlorobenzene	FF. 3-Nitroaniline	HHH. Benzo(k)fluoranthene	JJJJ. Acetophenone	L1. n-Phenylene diamine
E. 1,4-Dichlorobenzene	GG. Acenaphthene	III. Benzo(a)pyrene	KKKK. Atrazine	M1. 1,4-Naphthoquinone
F. 1,2-Dichlorobenzene	HH. 2,4-Dinitrophenol	JJJ. Indeno(1,2,3-cd)pyrene	LLLL. Benzaldehyde	N1. N-Nitro-o-toluidine
G. 2-Methylphenol	II. 4-Nitrophenol	KKK. Dibenz(a,h)anthracene	MMMM. Caprolactam	O1. 1,3,5-Trinitrobenzene
H. 2,2'-Oxybis(1-chloropropane)	JJ. Dibenzofuran	LLL. Benzo(g,h,i)perylene	NNNN. 2,6-Dichlorophenol	P1. Pentachlorobenzene
I. 4-Methylphenol	KK. 2,4-Dinitrotoluene	MMM. Bis(2-Chloroisopropyl)ether	OOOO. 1,2-Diphenylhydrazine	Q1. 4-Aminobiphenyl
J. N-Nitroso-di-n-propylamine	LL. Diethylphthalate	NNN. Aniline	PPPP. 3-Methylphenol	R1. 2-Naphthylamine
K. Hexachloroethane	MM. 4-Chlorophenyl-phenyl ether	OOO. N-Nitrosodimethylamine	QQQQ. 3&4-Methylphenol	S1. Triphenylene
L. Nitrobenzene	NN. Fluorene	PPP. Benzoic Acid	RRRR. 4-Dimethyldibenzothiophene (4MDT)	T1. Octachlorostyrene
M. Isophorone	OO. 4-Nitroaniline	QQQ. Benzyl alcohol	SSSS. 2/3-Dimethyldibenzothiophene (4MDT)	U1. Famphur
N. 2-Nitrophenol	PP. 4,6-Dinitro-2-methylphenol	RRR. Pyridine	TTTT. 1-Methyldibenzothiophene (1MDT)	V1. 1,4-phenylenediamine
O. 2,4-Dimethylphenol	QQ. N-Nitrosodiphenylamine	SSS. Benzidine	UUUU.. 2,3,4,6-Tetrachlorophenol	W1. Methapyrilene
P. Bis(2-chloroethoxy)methane	RR. 4-Bromophenyl-phenylether	TTT. 1-Methylnaphthalene	VVVV. 1,2,4,5-Tetrachlorobenzene	X1. Pentachloroethane
Q. 2,4-Dichlorophenol	SS. Hexachlorobenzene	UUU.Benzo(b)thiophene	WWWW.. 2-Picoline	Y1. 3,3'-Dimethylbenzidine
R. 1,2,4-Trichlorobenzene	TT. Pentachlorophenol	VVV.Benzonaphthothiophene	XXXX. 3-Methylcholanthrene	Z1. o-Toluidine
S. Naphthalene	UU. Phenanthrene	WWW.Benzo(e)pyrene	YYYY. a,a-Dimethylphenethylamine	A2. 1-Naphthylamine
T. 4-Chloroaniline	VV. Anthracene	XXX. 2,6-Dimethylnaphthalene	ZZZZ. Hexachloropropene	B2. 4-Aminobiphenyl
U. Hexachlorobutadiene	WW. Carbazole	YYY. 2,3,5-Trimethylnaphthalene	A1. N-Nitrosodiethylamine	C2. 4-Nitroquinoline-1-oxide
V. 4-Chloro-3-methylphenol	XX. Di-n-butylphthalate	ZZZ. Perylene	B1. N-Nitrosodi-n-butylamine	D2. Hexachloropene
W. 2-Methylnaphthalene	YY. Fluoranthene	AAAA. Dibenzothiophene	C1. N-Nitrosomethylethylamine	E2. Bis (2-chloro-1-methylethyl) ether
X. Hexachlorocyclopentadiene	ZZ. Pyrene	BBBB. Benzo(a)fluoranthene	D1. N-Nitrosomorpholine	F2. Bifenthrin
Y. 2,4,6-Trichlorophenol	AAA. Butylbenzylphthalate	CCCC. Benzo(b)fluorene	E1. N-Nitrosopyrrolidine	G2. Cyfluthrin
Z. 2,4,5-Trichlorophenol	BBB. 3,3'-Dichlorobenzidine	DDDD. cis/trans-Decalin	F1. Phenacetin	H2. Cypermethrin
AA. 2-Chloronaphthalene	CCC. Benzo(a)anthracene	EEEE. Biphenyl	G1. 2-Acetylaminofluorene	I2. Permethrin (cis/trans)
BB. 2-Nitroaniline	DDD. Chrysene	FFFF. Retene	H1. Pronamide	J2. 5-Nitro-o-toluidine

LDC #: 52646A26

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: F2

METHOD: GC/MS BNA (EPA SW 846 Method 8270 D) SIM

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

Compound	Concentration (ug/L)		RPD (≤ 50 %)	QUAL
	1	5		
TTT	0.19	0.21	10	

Compound	Concentration ( )		RPD (≤ %)	QUAL

Compound	Concentration ( )		RPD (≤ %)	QUAL

Laboratory Data Consultants, Inc.
Data Validation Report

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

LDC Report Date: November 30, 2021

Parameters: Gasoline Range Organics

Validation Level: Stage 2B

Laboratory: APPL, Inc., Clovis, CA

Sample Delivery Group (SDG): 97541

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
ERH1661	BA40883	Water	09/15/21
ERH1662	BA40884	Water	09/15/21
ERH1663	BA40885	Water	09/15/21
ERH1664	BA40886	Water	09/15/21
ERH1665	BA40887	Water	09/15/21
ERH1666	BA40888	Water	09/15/21
ERH1667	BA40889	Water	09/15/21
ERH1668	BA40890	Water	09/15/21
ERH1669	BA40891	Water	09/15/21

Introduction

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

The analyses were performed by the following method:

Gasoline Range Organics by Environmental Protection Agency (EPA) SW 846 Method 8260B

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

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

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

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

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

U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The analyte was not detected and the associated numerical value is approximate.

X (Exclusion of data recommended): The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Exclusion of the data is recommended.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Code Reference

a ICP Serial Dilution %D was not within control limits.

b Presumed contamination from preparation (method blank).

c Calibration %RSD, r, r^2, %D or %R was noncompliant.

d The analysis with this flag should not be used because another more technically sound analysis is available.

e MS/MSD or Duplicate RPD was high.

f Presumed contamination from FB or ER.

g ICP ICS results were unsatisfactory.

h Holding times were exceeded.

i Internal standard performance was unsatisfactory.

k Estimated Maximum Possible Concentration (HRGC/HRMS only)

l LCS/LCSD %R was not within control limits.

m Result exceeded the calibration range.

o Cooler temperature or temperature blank was noncompliant and/or sample custody problems.

p RPD between two columns was high (GC only).

q MS/MSD recovery was not within control limits.

s Surrogate recovery was not within control limits.

t Presumed contamination from trip blank.

v Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

w LCS/LCSD RPD was high.

y Chemical recovery was not within control limits (Radiochemistry only).

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r^2) was greater than or equal to 0.990.

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

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

Samples ERH1661, ERH1663, ERH1665, and ERH1667 were identified as trip blanks. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Limit of Quantitation	Associated Samples
ERH1663	09/15/21	Gasoline range organics	23 ug/L	20 ug/L	ERH1664

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Limit of Quantitation	Modified Final Concentration
ERH1664	Gasoline range organics	46 ug/L	20 ug/L	46J+ ug/L

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 ERH1662 and ERH1669 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.

Due to trip blank contamination, data were qualified as estimated in one sample.

Red Hill Bulk Storage Facility, CTO 18F0126
Gasoline Range Organics - Data Qualification Summary - SDG 97541

No Sample Data Qualified in this SDG

Red Hill Bulk Storage Facility, CTO 18F0126
Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG 97541

No Sample Data Qualified in this SDG

Red Hill Bulk Storage Facility, CTO 18F0126
Gasoline Range Organics - Field Blank Data Qualification Summary - SDG 97541

Sample	Analyte	Modified Final Concentration	A or P	Code
ERH1664	Gasoline range organics	46J+ ug/L	A	T

LDC #: 52646A7
SDG #: 97541
Laboratory: APPL, Inc., Clovis, CA

VALIDATION COMPLETENESS WORKSHEET
Stage 2B

Date: 11/28/21
Page: 1 of 1
Reviewer: M
2nd Reviewer: M

METHOD: GC/MS Gasoline Range Organics (EPA SW 846 Method 8260B)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	
IV.	Continuing calibration	A	
V.	Laboratory Blanks	A	* * *
VI.	Field blanks	SW	TB = 1, 3, 5, 7
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	A	LCS ID
X.	Field duplicates	ND	D = 2, 9
XI.	Internal standards	A	
XII.	Target analyte quantitation	N	
XIII.	Target analyte identification	N	
XIV.	System performance	N	
XV.	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	ERH1661	TB	BA40883	Water	09/15/21
2	ERH1662	D	BA40884	Water	09/15/21
3	ERH1663	TB	BA40885	Water	09/15/21
4	ERH1664		BA40886	Water	09/15/21
5	ERH1665	TB	BA40887	Water	09/15/21
6	ERH1666		BA40888	Water	09/15/21
7	ERH1667	TB	BA40889	Water	09/15/21
8	ERH1668		BA40890	Water	09/15/21
9	ERH1669	D	BA40891	Water	09/15/21
10					

Notes:

	210920B-BLK						

LDC #: 52646A7

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: FT

METHOD: GC/MS VOA (EPA SW 846 Method 8260 B)

Y N N/A Were field blanks identified in this SDG?

Y N N/A Were target compounds detected in the field blanks?

Result / LOQ (t)

Blank units: ug/L **Associated sample units:** ug/L

Sampling date: 9/15/21

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: TB Associated Samples: 4

Compound	Blank ID	Sample Identification								
	3		4							
gasoline Range Organics	23 J / 20		46 J+ / 20							

Blank units: _____ **Associated sample units:** _____

Sampling date: _____

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

Laboratory Data Consultants, Inc.
Data Validation Report

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

LDC Report Date: December 2, 2021

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 4

Laboratory: APPL, Inc., Clovis, CA

Sample Delivery Group (SDG): 97541

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
ERH1662	BA40884	Water	09/15/21
ERH1664	BA40886	Water	09/15/21
ERH1666	BA40888	Water	09/15/21
ERH1668	BA40890	Water	09/15/21
ERH1669	BA40891	Water	09/15/21
ERH1662(SGCU)	BA40884(SGCU)	Water	09/15/21
ERH1664(SGCU)	BA40886(SGCU)	Water	09/15/21
ERH1666(SGCU)	BA40888(SGCU)	Water	09/15/21
ERH1668(SGCU)	BA40890(SGCU)	Water	09/15/21
ERH1669(SGCU)	BA40891(SGCU)	Water	09/15/21

Samples ending in "SGCU" underwent Silica Gel cleanup

Introduction

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

The analyses were performed by the following method:

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

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.

X (Exclusion of data recommended): The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Exclusion of the data is recommended.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Code Reference

a ICP Serial Dilution %D was not within control limits.

b Presumed contamination from preparation (method blank).

c Calibration %RSD, r, r^2, %D or %R was noncompliant.

d The analysis with this flag should not be used because another more technically sound analysis is available.

e MS/MSD or Duplicate RPD was high.

f Presumed contamination from FB or ER.

g ICP ICS results were unsatisfactory.

h Holding times were exceeded.

i Internal standard performance was unsatisfactory.

k Estimated Maximum Possible Concentration (HRGC/HRMS only)

l LCS/LCSD %R was not within control limits.

m Result exceeded the calibration range.

o Cooler temperature or temperature blank was noncompliant and/or sample custody problems.

p RPD between two columns was high (GC only).

q MS/MSD recovery was not within control limits.

s Surrogate recovery was not within control limits.

t Presumed contamination from trip blank.

v Unusual problems found with the data not defined elsewhere. Description of the problem can be found in the validation report.

w LCS/LCSD RPD was high.

y Chemical recovery was not within control limits (Radiochemistry only).

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For analytes where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the analytes, all coefficients of determination (r^2) were greater than or equal to 0.990.

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 with the following exceptions:

Blank ID	Extraction Date	Analyte	Concentration	Limit of Quantitation	Associated Samples
210922A1	09/22/21	Oil (C24-C40)	150 ug/L	320 ug/L	ERH1662(SGCU) ERH1664(SGCU) ERH1666(SGCU) ERH1668(SGCU) ERH1669(SGCU)

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
ERH1662(SGCU)	Oil (C24-C40)	150 ug/L	300U ug/L
ERH1664(SGCU)	Oil (C24-C40)	160 ug/L	300U ug/L
ERH1666(SGCU)	Oil (C24-C40)	440 ug/L	440J+ ug/L
ERH1668(SGCU)	Oil (C24-C40)	370 ug/L	370J+ ug/L
ERH1669(SGCU)	Oil (C24-C40)	250 ug/L	300U ug/L

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 with the following exceptions:

Sample	Surrogate	%R (Limits)	Affected Analyte	Flag	A or P
ERH1662(SGCU)	Octacosane	148 (60-142)	All analytes	J+ (all detects)	P
ERH1664(SGCU)	Octacosane Ortho-Terphenyl	172 (60-142) 136 (56-125)	All analytes	J+ (all detects)	P
ERH1668(SGCU)	Octacosane Ortho-Terphenyl	159 (60-142) 133 (56-125)	All analytes	J+ (all detects)	P
ERH1669(SGCU)	Octacosane Ortho-Terphenyl	156 (60-142) 131 (56-125)	All analytes	J+ (all detects)	P

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 with the following exceptions:

LCS ID (Associated Samples)	Analyte	LCS %R (Limits)	LCSD %R (Limits)	Flag	A or P
210922A-LCS/LCSD (ERH1662 ERH1664 ERH1666 ERH1668 ERH1669)	Oil (C24-C40)	-	123 (41-113)	J+ (all detects)	A
210922A1-LCS/LCSD (ERH1662(SGCU) ERH1666(SGCU) ERH1668(SGCU) ERH1669(SGCU))	Diesel (C10-C24)	184 (36-132)	134 (36-132)	NA	-
210922A1-LCS/LCSD (ERH1664(SGCU))	Diesel (C10-C24)	184 (36-132)	134 (36-132)	J+ (all detects)	A
210922A1-LCS/LCSD (ERH1662(SGCU) ERH1664(SGCU) ERH1666(SGCU) ERH1668(SGCU) ERH1669(SGCU))	Oil (C24-C40)	187 (41-113)	132 (41-113)	J+ (all detects)	A

Relative percent differences (RPD) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Analyte	RPD (Limits)	Flag	A or P
210922A1-LCS/LCSD (ERH1662(SGCU) ERH1666(SGCU) ERH1668(SGCU) ERH1669(SGCU))	Diesel (C10-C24)	31.5 (≤30)	NA	-
210922A1-LCS/LCSD (ERH1664(SGCU))	Diesel (C10-C24)	31.5 (≤30)	J+ (all detects)	A
210922A1-LCS/LCSD (ERH1662(SGCU) ERH1664(SGCU) ERH1666(SGCU) ERH1668(SGCU) ERH1669(SGCU))	Oil (C24-C40)	34.6 (≤30)	J (all detects)	A

IX. Field Duplicates

Samples ERH1662 and ERH1669 and samples ERH1662(SGCU) and ERH1669(SGCU) were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD (Limits)
	ERH1662	ERH1669	
Diesel (C10-C24)	240	280	15 (≤50)
Oil (C24-C40)	210	310	38 (≤50)

Analyte	Concentration (ug/L)		RPD (Limits)
	ERH1662(SGCU)	ERH1669(SGCU)	
Oil (C24-C40)	150	250	50 (≤50)

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.

Due to surrogate %R and LCS/LCSD %R and RPD, data were qualified as estimated in ten samples.

Due to laboratory blank contamination, data were qualified as estimated or not detected in five samples.

Red Hill Bulk Storage Facility, CTO 18F0126
Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG 97541

Sample	Analyte	Flag	A or P	Reason (Code)
ERH1662(SGCU) ERH1664(SGCU) ERH1668(SGCU) ERH1669(SGCU)	All analytes	J+ (all detects)	P	Surrogates (%R) (s)
ERH1662 ERH1664 ERH1666 ERH1668 ERH1669	Oil (C24-C40)	J+ (all detects)	A	Laboratory control samples (%R) (l)
ERH1664(SGCU)	Diesel (C10-C24)	J (all detects)	A	Laboratory control samples (%R)(RPD) (l) (w)
ERH1662(SGCU) ERH1664(SGCU) ERH1666(SGCU) ERH1668(SGCU) ERH1669(SGCU)	Oil (C24-C40)	J (all detects)	A	Laboratory control samples (%R)(RPD) (l) (w)

Red Hill Bulk Storage Facility, CTO 18F0126
Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG 97541

Sample	Analyte	Modified Final Concentration	A or P	Code
ERH1662(SGCU)	Oil (C24-C40)	300U ug/L	A	b
ERH1664(SGCU)	Oil (C24-C40)	300U ug/L	A	b
ERH1666(SGCU)	Oil (C24-C40)	440J+ ug/L	A	b
ERH1668(SGCU)	Oil (C24-C40)	370J+ ug/L	A	b
ERH1669(SGCU)	Oil (C24-C40)	300U ug/L	A	b

Red Hill Bulk Storage Facility, CTO 18F0126
Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 97541

No Sample Data Qualified in this SDG

LDC #: 52646A8
SDG #: 97541
Laboratory: APPL, Inc., Clovis, CA

VALIDATION COMPLETENESS WORKSHEET
Stage ~~2B~~ 4

Date: 11/28/21
Page: 1 of 1
Reviewer:
2nd Reviewer:

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

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	Initial calibration/ICV	A/A	%D RSD ≤ 20, r² ICV ≤ 20
III.	Continuing calibration / ending ccv	A	CCV ≤ 20/20
IV.	Laboratory Blanks	SW	
V.	Field blanks	N	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	CS
VIII.	Laboratory control samples	SW	LCS/D
IX.	Field duplicates	SW	D = 1,5 6,10
X.	Target analyte quantitation	N	
XI.	Target analyte identification	N	
XII.	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	ERH1662	D	BA40884	Water	09/15/21
2	ERH1664		BA40886	Water	09/15/21
3	ERH1666		BA40888	Water	09/15/21
4	ERH1668		BA40890	Water	09/15/21
5	ERH1669	D	BA40891	Water	09/15/21
6	ERH1662(SGCU)	D_1	BA40884(SGCU)	Water	09/15/21
7	ERH1664(SGCU)		BA40886(SGCU)	Water	09/15/21
8	ERH1666(SGCU)		BA40888(SGCU)	Water	09/15/21
9	ERH1668(SGCU)		BA40890(SGCU)	Water	09/15/21
10	ERH1669(SGCU)	D_2	BA40891(SGCU)	Water	09/15/21
11					
12					
13					

Notes:

1	210922A - BLK							
2	210922A1 - BLK							

LDC #: 52646A9

VALIDATION FINDINGS CHECKLIST

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?	✓			
IIa. 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 compounds 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?				

IX. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds detected in the field duplicates?	✓			
X. Target analyte quantitation				
Did the laboratory LOQs/RLs meet the QAPP LOQs/RLs?	✓			
Wereanalyte 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?				
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

LDC #: 52646A0

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: FT

METHOD: ✓ GC ___ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Result / LOQ

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Level IV/D Only

Y N N/A (Gasoline and aromatics only)Was a method blank analyzed with each 24 hour batch?
Y N N/A Was a method blank analyzed for each analytical / extraction batch of ≤20 samples?

(b)

Blank extraction date: 9/22/21 **Blank analysis date:** 10/6/21 **Associated samples:** 6 - 10

Conc. units: ug/L

Compound	Blank ID	Sample Identification						
	210922A1	6	7	8	9	10		
Oil (C_{24}-C_{40})	150	150/300U	160/300U	440 J+	370 J+	250/300U		
	320	320	320	320	320	320		

Blank extraction date: ___ **Blank analysis date:** ___ **Associated samples:** ___

Conc. units: ___

Compound	Blank ID	Sample Identification						

ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 52646A8

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

METHOD: ✓ **GC** ___ **HPLC**

Are surrogates required by the method? Yes___ or No___.

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were surrogates spiked into all samples and blanks?

Y N N/A Did all surrogate recoveries (%R) meet the QC limits?

(5)

#	Sample ID	Detector/ Column	Surrogate Compound	%R (Limits)	Qualifications
	6		G	148 (60 - 142)	J+ dil/P ND+Det
				( )	
				( )	
	8		G	172 (60 - 142)	J+ det/P ND+Det
			H	136 (56 - 125)	↓
				( )	
	9		↓	159 (↓)	J+ dil/P ND+Det
				133 (↓)	↓
				( )	
	10		↓	156 (↓)	J+ dil/P ND+Det
				131 (↓)	↓
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

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

LDC #: 52646A8

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Reviewer: FT

METHOD: ✓ GC __ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG?

Y N N/A Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits?

%RPD = (W)

%R = (L)

Level IV/D Only

Y N N/A Was an LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

#	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	210922A-lcs ID	Oil (C24-C40)	( )	123 (41-113)	( )	1→5, 210922A-BLK	J+ dil/p all Det
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
	210922A1-lcs ID	Diesel (C10-C24)	184 (36-132)	134 (36-132)	( )	6→10	J+ dil/p #7 det
		Oil (C24-C40)	187 (41-113)	132 (41-113)	( )	210922A1-BLK	↓ all Det
			( )	( )	( )		
		↓	( )	( )	31.5 (30)		J dil/p #7 det
			( )	( )	34.6 (30)		↓ all Det
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		

LDC #: 52646A0

VALIDATION FINDINGS WORKSHEET
Field Duplicates

METHOD: V GC __ HPLC

Y N N/A Were field duplicate pairs identified in this SDG?

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

Compound	Concentration (ug/L)		%RPD Limit (≤ 50 %)	Qualification (Parent only)
	1	5		
Diesel (C_{10} - C_{24})	240 J	280 J	15	
Oil (C_{24} - C_{40})	210 J	310 J	38	

Compound	Concentration (ug/L)		%RPD Limit (≤ 50 %)	Qualification (Parent only)
	6	10		
Oil (C_{24} - C_{40})	150 J	250 J	50	

Compound	Concentration ( )		%RPD Limit (≤ %))	Qualification (Parent only)

Method: DRO 8015C

Calibration Date	System	Compound	Standard	(Y) Response	WEIGHTED (X) Concentration
8/30/2021	GC-Apollo	Motor oil (C24-C40)	1	41451191.000	5.0
			2	48710805.000	10.0
			3	167306131.000	50.0
			4	768486801.000	250.0
			5	2987558435.000	1000.0
			6	4398400914.000	1500.0
			7	6000685216.000	2000.0

Regression Output		*Reported*
Constant	*18633287.826932*	*23900000.0*
Std Err of Y Est		
R Squared	*0.999789*	*1.000000*
Degrees of Freedom		
X Coefficient(s)	*2966182.030781*	*2960000.0*
Std Err of Coef.		
Correlation Coefficient	*0.999894*	
Coefficient of Determination (r^2)	*0.999789*	*1.000000*

LDC #:_____

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: FT

METHOD: GC _____HPLC_____

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

CF = A/C
Average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where: A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported CF (std)	Recalculated CF (std)	Reported CF (initial)	Recalculated CF (intial)	Reported %RSD	Recalculated %RSD
1									
2									
3									
4									

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

LDC #: 52646 AX

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

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 compounds 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 compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(ICAL)/ CCV Conc.	Reported CF/ Conc. CCV	Recalculated CF/ Conc. CCV	Reported %D	Recalculated %D
1	928103 CCV	9/30/21	Motor Oil (C24-C40)	250	267.313	267.313	6.9	6.9
2	1005049 CCV	10/6/21	↓	250	274.517	274.517	9.8	9.8
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 #: 52646A8

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: FT

METHOD: ✓ GC ___ HPLC

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: # 1

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
octacosane		142.857	162.348	114	114	0
o-Terphenyl		↓	133.426	93.4	93.4	0

Sample ID: _____

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

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

LDC #: 52646AB

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: FT

METHOD: ✓ **GC** ___ **HPLC**

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

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

Where SSC = Spiked sample concentration
LCS = Laboratory Control Sample

SA = Spike added
LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples:_____

Compound	Spike Added ( )		Spike Sample Concentration ( )		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 52646A8

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: FT

METHOD: ✓ GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

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

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

Example:

Sample ID. #2 Compound Name Diesel (C_{10} - C_{24})

Concentration = $\frac{(22111702.34)(5)(1000)}{(2019597)(2)(1090)}$ =

= 2606.8U

#	Sample ID	Compound	Reported Concentrations (ug/L)	Recalculated Results Concentrations (ug/L)	Qualifications
	#2	Diesel (C_{10}-C_{24})	2600	2606.8	

Comments:

EPA_NO	LAB_ID	DF	ANALYTE	COLL_DATE	ANAL_DATE	QCLev	RESULT	UNITS	LAB_Q	LOQ	LOD	REV	Q_C
METHOD: **8015B_E**													
ERH1662	BA40884	1	C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	9/15/2021	10/6/2021 1:21:00 PM	3	300.0	UG_L	U	320	300.0	U	
ERH1662	BA40884	1	C10-C24 DIESEL RANGE ORGANICS	9/15/2021	9/30/2021 6:57:00 PM	3	240	UG_L	J	320	300.0	J	
ERH1662	BA40884	1	C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	9/15/2021	10/6/2021 1:21:00 PM	3		UG_L	B JD	320	300.0	UJ	s,l,w,b
ERH1662	BA40884	1	C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE ORGANICS	9/15/2021	9/30/2021 6:57:00 PM	3	210	UG_L	B J	320	300.0	J+	l
ERH1664	BA40886	1	C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	9/15/2021	10/6/2021 2:18:00 PM	3	1100	UG_L	D	320	300.0	J	s,l,w
ERH1664	BA40886	1	C10-C24 DIESEL RANGE ORGANICS	9/15/2021	9/30/2021 7:25:00 PM	3	2600	UG_L		320	300.0		
ERH1664	BA40886	1	C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	9/15/2021	10/6/2021 2:18:00 PM	3		UG_L	B JD	320	300.0	UJ	s,l,w,b
ERH1664	BA40886	1	C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE ORGANICS	9/15/2021	9/30/2021 7:25:00 PM	3	470	UG_L	B	320	300.0	J+	l
ERH1666	BA40888	1	C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	9/15/2021	10/6/2021 2:46:00 PM	3	300.0	UG_L	U	320	300.0	U	
ERH1666	BA40888	1	C10-C24 DIESEL RANGE ORGANICS	9/15/2021	9/30/2021 7:54:00 PM	3	350	UG_L		320	300.0		
ERH1666	BA40888	1	C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	9/15/2021	10/6/2021 2:46:00 PM	3	440	UG_L	B D	320	300.0	J	l,w,b
ERH1666	BA40888	1	C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE ORGANICS	9/15/2021	9/30/2021 7:54:00 PM	3	700	UG_L	B	320	300.0	J+	l
ERH1668	BA40890	1	C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	9/15/2021	10/6/2021 3:15:00 PM	3	300.0	UG_L	U	320	300.0	U	
ERH1668	BA40890	1	C10-C24 DIESEL RANGE ORGANICS	9/15/2021	9/30/2021 8:22:00 PM	3	300.0	UG_L	U	320	300.0	U	
ERH1668	BA40890	1	C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	9/15/2021	10/6/2021 3:15:00 PM	3	370	UG_L	B D	320	300.0	J	s,l,w,b
ERH1668	BA40890	1	C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE ORGANICS	9/15/2021	9/30/2021 8:22:00 PM	3	270	UG_L	B J	320	300.0	J+	l
ERH1669	BA40891	1	C10-C24 DIESEL RANGE ORG SILICA GEL CLEAN UP	9/15/2021	10/6/2021 3:43:00 PM	3	300.0	UG_L	U	320	300.0	U	
ERH1669	BA40891	1	C10-C24 DIESEL RANGE ORGANICS	9/15/2021	9/30/2021 8:50:00 PM	3	280	UG_L	J	320	300.0	J	
ERH1669	BA40891	1	C24-C40 OIL RANGE ORGANICS SILICA GEL CLEAN UP	9/15/2021	10/6/2021 3:43:00 PM	3		UG_L	B JD	320	300.0	UJ	s,l,w,b
ERH1669	BA40891	1	C24-C40 TOTAL PETROLEUM HYDROCARBONS, OIL RANGE ORGANICS	9/15/2021	9/30/2021 8:50:00 PM	3	310	UG_L	B J	320	300.0	J+	l
METHOD: **8260B**													
ERH1661	BA40883	1	BENZENE	9/15/2021	9/20/2021 10:53:00 PM	3	0.30	UG_L	U	1.0	0.30	U	
ERH1661	BA40883	1	ETHYLBENZENE	9/15/2021	9/20/2021 10:53:00 PM	3	0.50	UG_L	U	1.0	0.50	U	
ERH1661	BA40883	1	PETROLEUM HYDROCARBONS C6-C10	9/15/2021	9/20/2021 10:52:00 PM	3	18.0	UG_L	U	20	18.0	U	
ERH1661	BA40883	1	TOLUENE	9/15/2021	9/20/2021 10:53:00 PM	3	0.30	UG_L	U	1.0	0.30	U	

EPA_NO	LAB_ID	DF	ANALYTE	COLL_DATE	ANAL_DATE	QCLev	RESULT	UNITS	LAB_Q	LOQ	LOD	REV	Q_C
METHOD: **8260B**													
ERH1661	BA40883	1	Xylenes	9/15/2021	9/20/2021 10:53:00 PM	3	0.30	UG_L	U	2.0	0.30	U	
ERH1662	BA40884	1	BENZENE	9/15/2021	9/20/2021 11:20:00 PM	3	0.30	UG_L	U	1.0	0.30	U	
ERH1662	BA40884	1	ETHYLBENZENE	9/15/2021	9/20/2021 11:20:00 PM	3	0.50	UG_L	U	1.0	0.50	U	
ERH1662	BA40884	1	PETROLEUM HYDROCARBONS C6-C10	9/15/2021	9/20/2021 11:21:00 PM	3	18.0	UG_L	U	20	18.0	U	
ERH1662	BA40884	1	TOLUENE	9/15/2021	9/20/2021 11:20:00 PM	3	0.30	UG_L	U	1.0	0.30	U	
ERH1662	BA40884	1	Xylenes	9/15/2021	9/20/2021 11:20:00 PM	3	0.30	UG_L	U	2.0	0.30	U	
ERH1663	BA40885	1	BENZENE	9/15/2021	9/20/2021 11:48:00 PM	3	0.30	UG_L	U	1.0	0.30	U	
ERH1663	BA40885	1	ETHYLBENZENE	9/15/2021	9/20/2021 11:48:00 PM	3	0.50	UG_L	U	1.0	0.50	U	
ERH1663	BA40885	1	PETROLEUM HYDROCARBONS C6-C10	9/15/2021	9/20/2021 11:49:00 PM	3	23	UG_L		20	18.0		
ERH1663	BA40885	1	TOLUENE	9/15/2021	9/20/2021 11:48:00 PM	3	0.30	UG_L	U	1.0	0.30	U	
ERH1663	BA40885	1	Xylenes	9/15/2021	9/20/2021 11:48:00 PM	3	0.30	UG_L	U	2.0	0.30	U	
ERH1664	BA40886	1	BENZENE	9/15/2021	9/21/2021 12:16:00 AM	3	0.30	UG_L	U	1.0	0.30	U	
ERH1664	BA40886	1	ETHYLBENZENE	9/15/2021	9/21/2021 12:16:00 AM	3	0.50	UG_L	U	1.0	0.50	U	
ERH1664	BA40886	1	PETROLEUM HYDROCARBONS C6-C10	9/15/2021	9/21/2021 12:17:00 AM	3	46	UG_L		20	18.0	J+	t
ERH1664	BA40886	1	TOLUENE	9/15/2021	9/21/2021 12:16:00 AM	3	0.30	UG_L	U	1.0	0.30	U	
ERH1664	BA40886	1	Xylenes	9/15/2021	9/21/2021 12:16:00 AM	3	0.30	UG_L	U	2.0	0.30	U	
ERH1665	BA40887	1	BENZENE	9/15/2021	9/21/2021 12:44:00 AM	3	0.30	UG_L	U	1.0	0.30	U	
ERH1665	BA40887	1	ETHYLBENZENE	9/15/2021	9/21/2021 12:44:00 AM	3	0.50	UG_L	U	1.0	0.50	U	
ERH1665	BA40887	1	PETROLEUM HYDROCARBONS C6-C10	9/15/2021	9/21/2021 12:45:00 AM	3	18.0	UG_L	U	20	18.0	U	
ERH1665	BA40887	1	TOLUENE	9/15/2021	9/21/2021 12:44:00 AM	3	0.30	UG_L	U	1.0	0.30	U	
ERH1665	BA40887	1	Xylenes	9/15/2021	9/21/2021 12:44:00 AM	3	0.30	UG_L	U	2.0	0.30	U	
ERH1666	BA40888	1	BENZENE	9/15/2021	9/21/2021 1:13:00 AM	3	0.30	UG_L	U	1.0	0.30	U	
ERH1666	BA40888	1	ETHYLBENZENE	9/15/2021	9/21/2021 1:13:00 AM	3	0.50	UG_L	U	1.0	0.50	U	
ERH1666	BA40888	1	PETROLEUM HYDROCARBONS C6-C10	9/15/2021	9/21/2021 1:12:00 AM	3	18.0	UG_L	U	20	18.0	U	
ERH1666	BA40888	1	TOLUENE	9/15/2021	9/21/2021 1:13:00 AM	3	0.30	UG_L	U	1.0	0.30	U	
ERH1666	BA40888	1	Xylenes	9/15/2021	9/21/2021 1:13:00 AM	3	0.30	UG_L	U	2.0	0.30	U	
ERH1667	BA40889	1	BENZENE	9/15/2021	9/21/2021 1:40:00 AM	3	0.30	UG_L	U	1.0	0.30	U	

EPA_NO	LAB_ID	DF	ANALYTE	COLL_DATE	ANAL_DATE	QCLev	RESULT	UNITS	LAB_Q	LOQ	LOD	REV	Q_C
METHOD: **8260B**													
ERH1667	BA40889	1	ETHYLBENZENE	9/15/2021	9/21/2021 1:40:00 AM	3	0.50	UG_L	U	1.0	0.50	U	
ERH1667	BA40889	1	PETROLEUM HYDROCARBONS C6-C10	9/15/2021	9/21/2021 1:41:00 AM	3	18.0	UG_L	U	20	18.0	U	
ERH1667	BA40889	1	TOLUENE	9/15/2021	9/21/2021 1:40:00 AM	3	0.30	UG_L	U	1.0	0.30	U	
ERH1667	BA40889	1	Xylenes	9/15/2021	9/21/2021 1:40:00 AM	3	0.30	UG_L	U	2.0	0.30	U	
ERH1668	BA40890	1	BENZENE	9/15/2021	9/21/2021 2:08:00 AM	3	0.30	UG_L	U	1.0	0.30	U	
ERH1668	BA40890	1	ETHYLBENZENE	9/15/2021	9/21/2021 2:08:00 AM	3	0.50	UG_L	U	1.0	0.50	U	
ERH1668	BA40890	1	PETROLEUM HYDROCARBONS C6-C10	9/15/2021	9/21/2021 2:09:00 AM	3	18.0	UG_L	U	20	18.0	U	
ERH1668	BA40890	1	TOLUENE	9/15/2021	9/21/2021 2:08:00 AM	3	0.30	UG_L	U	1.0	0.30	U	
ERH1668	BA40890	1	Xylenes	9/15/2021	9/21/2021 2:08:00 AM	3	0.30	UG_L	U	2.0	0.30	U	
ERH1669	BA40891	1	BENZENE	9/15/2021	9/21/2021 2:36:00 AM	3	0.30	UG_L	U	1.0	0.30	U	
ERH1669	BA40891	1	ETHYLBENZENE	9/15/2021	9/21/2021 2:36:00 AM	3	0.50	UG_L	U	1.0	0.50	U	
ERH1669	BA40891	1	PETROLEUM HYDROCARBONS C6-C10	9/15/2021	9/21/2021 2:37:00 AM	3	18.0	UG_L	U	20	18.0	U	
ERH1669	BA40891	1	TOLUENE	9/15/2021	9/21/2021 2:36:00 AM	3	0.30	UG_L	U	1.0	0.30	U	
ERH1669	BA40891	1	Xylenes	9/15/2021	9/21/2021 2:36:00 AM	3	0.30	UG_L	U	2.0	0.30	U	
METHOD: **8270DSIM**													
ERH1662	BA40884	1	1-METHYLNAPHTHALENE	9/15/2021	9/27/2021 3:09:00 PM	3	0.19	UG_L	J	0.2	0.10	J	
ERH1662	BA40884	1	2-METHYLNAPHTHALENE	9/15/2021	9/27/2021 3:09:00 PM	3	0.10	UG_L	U	0.2	0.10	U	
ERH1662	BA40884	1	NAPHTHALENE	9/15/2021	9/27/2021 3:09:00 PM	3	0.10	UG_L	U	0.2	0.10	U	
ERH1664	BA40886	1	1-METHYLNAPHTHALENE	9/15/2021	9/27/2021 3:31:00 PM	3	33	UG_L		0.2	0.10		
ERH1664	BA40886	1	2-METHYLNAPHTHALENE	9/15/2021	9/27/2021 3:31:00 PM	3	33	UG_L		0.2	0.10		
ERH1664	BA40886	1	NAPHTHALENE	9/15/2021	9/27/2021 3:31:00 PM	3	70	UG_L		0.2	0.10		
ERH1666	BA40888	1	1-METHYLNAPHTHALENE	9/15/2021	9/27/2021 3:53:00 PM	3	0.10	UG_L	U	0.2	0.10	U	
ERH1666	BA40888	1	2-METHYLNAPHTHALENE	9/15/2021	9/27/2021 3:53:00 PM	3	0.10	UG_L	U	0.2	0.10	U	
ERH1666	BA40888	1	NAPHTHALENE	9/15/2021	9/27/2021 3:53:00 PM	3	0.10	UG_L	U	0.2	0.10	U	
ERH1668	BA40890	1	1-METHYLNAPHTHALENE	9/15/2021	9/27/2021 4:15:00 PM	3	0.10	UG_L	U	0.2	0.10	U	
ERH1668	BA40890	1	2-METHYLNAPHTHALENE	9/15/2021	9/27/2021 4:15:00 PM	3	0.10	UG_L	U	0.2	0.10	U	
ERH1668	BA40890	1	NAPHTHALENE	9/15/2021	9/27/2021 4:15:00 PM	3	0.10	UG_L	U	0.2	0.10	U	

EPA_NO	LAB_ID	DF	ANALYTE	COLL_DATE	ANAL_DATE	QCLev	RESULT	UNITS	LAB_Q	LOQ	LOD	REV	Q_C
METHOD: **8270DSIM**													
ERH1669	BA40891	1	1-METHYLNAPHTHALENE	9/15/2021	9/27/2021 4:38:00 PM	3	0.21	UG_L		0.2	0.10		
ERH1669	BA40891	1	2-METHYLNAPHTHALENE	9/15/2021	9/27/2021 4:38:00 PM	3	0.10	UG_L	U	0.2	0.10	U	
ERH1669	BA40891	1	NAPHTHALENE	9/15/2021	9/27/2021 4:38:00 PM	3	0.10	UG_L	U	0.2	0.10	U	