CETIFICATION

SDG No:	MC46487	Laboratory:	Accutest, Massachusetts
Site:	BMS, Building 5 Area, PR Humacao, PR	Matrix:	Groundwater

SUMMARY: Groundwater samples (Table 1) were collected on the BMSMC facility – Building 5 Area. The BMSMC facility is located in Humacao, PR. Samples were taken July 16-20, 2016 and were analyzed in Accutest Laboratory of Marlborough, Massachusetts that reported the data under SDG No.: MC46487. Results were validated using the following quality control criteria of the methods employed (MADEP VPH and MAPED EPH, Massachusets Department of Environmental Protection, 2004) and the latest validation guidelines (July, 2015) of the EPA Hazardous Waste Support Section. The analyses performed are shown in Table 1. Individual data review worksheets are enclosed for each target analyte group. The data sample organic data samples summary form shows for analytes results that were qualified.

In summary the results are valid and can be used for decision taking purposes.

Table 1. Samples analyzed and analysis performed

SAMPLE ID	SAMPLE DESCRIPTION	MATRIX	ANALYSIS PERFORMED
MC46487-1	MW-3	Groundwater	Volatiles TPHC Ranges Extractable TPHC Ranges
MC46487-2	MW-5	Groundwater	Volatiles TPHC Ranges Extractable TPHC Ranges
MC46487-3	MW-13	Groundwater	Volatiles TPHC Ranges
MC46487-4	BR-4	Groundwater	Volatiles TPHC Ranges Extractable TPHC Ranges
MC46487-5	MW-16	Groundwater	Volatiles TPHC Ranges Extractable TPHC Ranges
MC46487-6	MW-23S	Groundwater	Volatile TPHC Ranges Extractable TPHC Ranges
MC46487-7	MW-21S	Groundwater	Volatile TPHC Ranges Extractable TPHC Ranges

Reviewer Name: Rafael Infante
Chemist License 1888

Signature:

Date: July 17, 2016

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Report of Analysis

Client Sample ID:	MW-3		
Lab Sample ID:	MC46487-1	**Date Sampled:**	06/16/16
Matrix:	AQ - Ground Water	**Date Received:**	06/21/16
Method:	MADEP VPH REV 1.1	**Percent Solids:**	n/a
Project:	BMSMC, Building 5 Area, Puerto Rico		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AB94439.D	1	06/22/16	AF	n/a	n/a	GAB5203
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

Volatile TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C5- C8 Aliphatics (Unadj.)	32.8	50	25	ug/l	J
	C9- C12 Aliphatics (Unadj.)	342	50	25	ug/l	
	C9- C10 Aromatics (Unadj.)	232	50	25	ug/l	
	C5- C8 Aliphatics	32.5	50	25	ug/l	J
	C9- C12 Aliphatics	108	50	25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
	2,3,4-Trifluorotoluene	79%		70-130%
	2,3,4-Trifluorotoluene	88%		70-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	MW-3		
Lab Sample ID:	MC46487-1	**Date Sampled:**	06/16/16
Matrix:	AQ - Ground Water	**Date Received:**	06/21/16
Method:	MADEP EPH REV 1.1 SW846 3510C	**Percent Solids:**	n/a
Project:	BMSMC, Building 5 Area, Puerto Rico		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	DE14751.D	1	06/28/16	TA	06/21/16	OP47926	GDE819
Run #2							

	Initial Volume	Final Volume
Run #1	930 ml	2.0 ml
Run #2		

Extractable TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C11-C22 Aromatics (Unadj.)	289	110	31	ug/l	B
	C9-C18 Aliphatics	30.7	110	18	ug/l	JB
	C19-C36 Aliphatics	34.6	110	29	ug/l	JB
	C11-C22 Aromatics	256	110	31	ug/l	B

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	61%		40-140%
321-60-8	2-Fluorobiphenyl	80%		40-140%
3386-33-2	1-Chlorooctadecane	64%		40-140%
580-13-2	2-Bromonaphthalene	85%		40-140%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	MW-5		
Lab Sample ID:	MC46487-2	**Date Sampled:**	06/17/16
Matrix:	AQ - Ground Water	**Date Received:**	06/21/16
Method:	MADEP VPH REV 1.1	**Percent Solids:**	n/a
Project:	BMSMC, Building 5 Area, Puerto Rico		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AB94440.D	1	06/22/16	AF	n/a	n/a	GAB5203
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

Volatile TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C5- C8 Aliphatics (Unadj.)	36.1	50	25	ug/l	J
	C9- C12 Aliphatics (Unadj.)	476	50	25	ug/l	
	C9- C10 Aromatics (Unadj.)	55.3	50	25	ug/l	
	C5- C8 Aliphatics	25.9	50	25	ug/l	J
	C9- C12 Aliphatics	84.6	50	25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
	2,3,4-Trifluorotoluene	83%		70-130%
	2,3,4-Trifluorotoluene	94%		70-130%

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Rafael Infante Méndez
IC # 1888
QUIMICO LICENCIADO

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID:	MW-5		
Lab Sample ID:	MC46487-2	**Date Sampled:**	06/17/16
Matrix:	AQ - Ground Water	**Date Received:**	06/21/16
Method:	MADEP EPH REV 1.1 SW846 3510C	**Percent Solids:**	n/a
Project:	BMSMC, Building 5 Area, Puerto Rico		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	DE14752.D	1	06/28/16	TA	06/21/16	OP47926	GDE819
Run #2							

	Initial Volume	Final Volume
Run #1	930 ml	2.0 ml
Run #2		

Extractable TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C11-C22 Aromatics (Unadj.)	62.0	110	31	ug/l	JB
	C9-C18 Aliphatics	24.7	110	18	ug/l	JB
	C19-C36 Aliphatics	30.4	110	29	ug/l	JB
	C11-C22 Aromatics	59.2	110	31	ug/l	JB

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	63%		40-140%
321-60-8	2-Fluorobiphenyl	80%		40-140%
3386-33-2	1-Chlorooctadecane	67%		40-140%
580-13-2	2-Bromonaphthalene	89%		40-140%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	MW-13		
Lab Sample ID:	MC46487-3	Date Sampled:	06/17/16
Matrix:	AQ - Ground Water	Date Received:	06/21/16
Method:	MADEP VPH REV 1.1	Percent Solids:	n/a
Project:	BMSMC, Building 5 Area, Puerto Rico		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AB94441.D	1	06/22/16	AF	n/a	n/a	GAB5203
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

Volatile TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C5- C8 Aliphatics (Unadj.)	ND	50	25	ug/l	
	C9- C12 Aliphatics (Unadj.)	31.7	50	25	ug/l	J
	C9- C10 Aromatics (Unadj.)	ND	50	25	ug/l	
	C5- C8 Aliphatics	ND	50	25	ug/l	
	C9- C12 Aliphatics	ND	50	25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
	2,3,4-Trifluorotoluene	79%		70-130%
	2,3,4-Trifluorotoluene	88%		70-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	BR-4		
Lab Sample ID:	MC46487-4	Date Sampled:	06/17/16
Matrix:	AQ - Ground Water	Date Received:	06/21/16
Method:	MADEP VPH REV 1.1	Percent Solids:	n/a
Project:	BMSMC, Building 5 Area, Puerto Rico		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AB94442.D	1	06/22/16	AF	n/a	n/a	GAB5203
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

Volatile TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C5- C8 Aliphatics (Unadj.)	ND	50	25	ug/l	
	C9- C12 Aliphatics (Unadj.)	37.2	50	25	ug/l	J
	C9- C10 Aromatics (Unadj.)	30.6	50	25	ug/l	J
	C5- C8 Aliphatics	ND	50	25	ug/l	
	C9- C12 Aliphatics	ND	50	25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
	2,3,4-Trifluorotoluene	78%		70-130%
	2,3,4-Trifluorotoluene	87%		70-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	BR-4		
Lab Sample ID:	MC46487-4	**Date Sampled:**	06/17/16
Matrix:	AQ - Ground Water	**Date Received:**	06/21/16
Method:	MADEP EPH REV 1.1 SW846 3510C	**Percent Solids:**	n/a
Project:	BMSMC, Building 5 Area, Puerto Rico		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	DE14753.D	1	06/28/16	TA	06/21/16	OP47926	GDE819
Run #2							

	Initial Volume	Final Volume
Run #1	930 ml	2.0 ml
Run #2		

Extractable TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C11-C22 Aromatics (Unadj.)	44.3	110	31	ug/l	JB
	C9-C18 Aliphatics	39.7	110	18	ug/l	JB
	C19-C36 Aliphatics	51.9	110	29	ug/l	JB
	C11-C22 Aromatics	44.3	110	31	ug/l	JB

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	44%		40-140%
321-60-8	2-Fluorobiphenyl	70%		40-140%
3386-33-2	1-Chlorooctadecane	45%		40-140%
580-13-2	2-Bromonaphthalene	77%		40-140%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	MW-16		
Lab Sample ID:	MC46487-5	**Date Sampled:**	06/17/16
Matrix:	AQ - Ground Water	**Date Received:**	06/21/16
Method:	MADEP VPH REV 1.1	**Percent Solids:**	n/a
Project:	BMSMC, Building 5 Area, Puerto Rico		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AB94443.D	1	06/22/16	AF	n/a	n/a	GAB5203
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

Volatile TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C5- C8 Aliphatics (Unadj.)	ND	50	25	ug/l	
	C9- C12 Aliphatics (Unadj.)	ND	50	25	ug/l	
	C9- C10 Aromatics (Unadj.)	ND	50	25	ug/l	
	C5- C8 Aliphatics	ND	50	25	ug/l	
	C9- C12 Aliphatics	ND	50	25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
	2,3,4-Trifluorotoluene	78%		70-130%
	2,3,4-Trifluorotoluene	87%		70-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID:	MW-16		
Lab Sample ID:	MC46487-5	**Date Sampled:**	06/17/16
Matrix:	AQ - Ground Water	**Date Received:**	06/21/16
Method:	MADEP EPH REV 1.1 SW846 3510C	**Percent Solids:**	n/a
Project:	BMSMC, Building 5 Area, Puerto Rico		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	DE14754.D	1	06/28/16	TA	06/21/16	OP47926	GDE819
Run #2							

	Initial Volume	Final Volume
Run #1	950 ml	2.0 ml
Run #2		

Extractable TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C11-C22 Aromatics (Unadj.)	36.9	110	30	ug/l	JB
	C9-C18 Aliphatics	23.3	110	18	ug/l	JB
	C19-C36 Aliphatics	32.5	110	29	ug/l	JB
	C11-C22 Aromatics	36.9	110	30	ug/l	JB

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	57%		40-140%
321-60-8	2-Fluorobiphenyl	80%		40-140%
3386-33-2	1-Chlorooctadecane	56%		40-140%
580-13-2	2-Bromonaphthalene	88%		40-140%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	MW-23S		
Lab Sample ID:	MC46487-6	**Date Sampled:**	06/20/16
Matrix:	AQ - Ground Water	**Date Received:**	06/21/16
Method:	MADEP VPH REV 1.1	**Percent Solids:**	n/a
Project:	BMSMC, Building 5 Area, Puerto Rico		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AB94444.D	1	06/22/16	AF	n/a	n/a	GAB5203
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

Volatile TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C5- C8 Aliphatics (Unadj.)	ND	50	25	ug/l	
	C9- C12 Aliphatics (Unadj.)	ND	50	25	ug/l	
	C9- C10 Aromatics (Unadj.)	ND	50	25	ug/l	
	C5- C8 Aliphatics	ND	50	25	ug/l	
	C9- C12 Aliphatics	ND	50	25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
	2,3,4-Trifluorotoluene	80%		70-130%
	2,3,4-Trifluorotoluene	87%		70-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	MW-23S		
Lab Sample ID:	MC46487-6	**Date Sampled:**	06/20/16
Matrix:	AQ - Ground Water	**Date Received:**	06/21/16
Method:	MADEP EPH REV 1.1 SW846 3510C	**Percent Solids:**	n/a
Project:	BMSMC, Building 5 Area, Puerto Rico		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	DE14755.D	1	06/28/16	TA	06/21/16	OP47926	GDE819
Run #2							

	Initial Volume	Final Volume
Run #1	980 ml	2.0 ml
Run #2		

Extractable TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C11-C22 Aromatics (Unadj.)	34.3	100	29	ug/l	JB
	C9-C18 Aliphatics	20.8	100	17	ug/l	JB
	C19-C36 Aliphatics	29.5	100	28	ug/l	JB
	C11-C22 Aromatics	33.8	100	29	ug/l	JB

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	62%		40-140%
321-60-8	2-Fluorobiphenyl	76%		40-140%
3386-33-2	1-Chlorooctadecane	69%		40-140%
580-13-2	2-Bromonaphthalene	83%		40-140%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID:	MW-21S		
Lab Sample ID:	MC46487-7	**Date Sampled:**	06/20/16
Matrix:	AQ - Ground Water	**Date Received:**	06/21/16
Method:	MADEP VPH REV 1.1	**Percent Solids:**	n/a
Project:	BMSMC, Building 5 Area, Puerto Rico		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AB94445.D	1	06/22/16	AF	n/a	n/a	GAB5203
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

Volatile TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C5- C8 Aliphatics (Unadj.)	ND	50	25	ug/l	
	C9- C12 Aliphatics (Unadj.)	ND	50	25	ug/l	
	C9- C10 Aromatics (Unadj.)	ND	50	25	ug/l	
	C5- C8 Aliphatics	ND	50	25	ug/l	
	C9- C12 Aliphatics	ND	50	25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
	2,3,4-Trifluorotoluene	77%		70-130%
	2,3,4-Trifluorotoluene	88%		70-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID:	MW-21S		
Lab Sample ID:	MC46487-7	**Date Sampled:**	06/20/16
Matrix:	AQ - Ground Water	**Date Received:**	06/21/16
Method:	MADEP EPH REV 1.1 SW846 3510C	**Percent Solids:**	n/a
Project:	BMSMC, Building 5 Area, Puerto Rico		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	DE14756.D	1	06/28/16	TA	06/21/16	OP47926	GDE819
Run #2							

	Initial Volume	Final Volume
Run #1	960 ml	2.0 ml
Run #2		

Extractable TPHC Ranges

CAS No.	Compound	Result	RL	MDL	Units	Q
	C11-C22 Aromatics (Unadj.)	33.3	100	30	ug/l	JB
	C9-C18 Aliphatics	22.4	100	17	ug/l	JB
	C19-C36 Aliphatics	40.0	100	28	ug/l	JB
	C11-C22 Aromatics	32.8	100	30	ug/l	JB

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	66%		40-140%
321-60-8	2-Fluorobiphenyl	80%		40-140%
3386-33-2	1-Chlorooctadecane	67%		40-140%
580-13-2	2-Bromonaphthalene	87%		40-140%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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SGS Accutest ~~Dayton~~ New England
~~2235 Route 130, Dayton, NJ 08810~~ 50 D'Angelo
TEL. 732-329-0200 FAX. 732-329-3499/3480
www.accutest.com Marlborough MA

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PAGE 1 OF 1

Sample Order Control # MC46487

SGS Accutest Job # Get from NJ

Client / Reporting Information	Project Information	Requested Analysis (see TEST CODE sheet)	Matrix Codes
Company Name: Anderson Mulholland Assoc. Inc.	Project Name: BMS 2Q2016 Groundwater		DW - Drinking Water; GW - Ground Water; WW - Water; SW - Surface Water; SO - Soil; SL - Sludge; SED-Sediment; OI - Oil; LIQ - Other Liquid; AIR - Air; SOL - Other Solid; WP - Wipe; FB-Field Blank; EB-Equipment Blank; RB- Rinse Blank; TB-Trip Blank
Street Address: 2700 Westchester	Street:	Billing Information (if different from Report to):	
City / State / Zip: Purchase NY	City / State: Humacao PR	Company Name:	
Project Contact / E-mail: Terry Taylor	Project #:	Street Address:	
Phone #: 914-251-0400 / Fax #:	Client Purchase Order #:	City / State / Zip:	
Sampler(s) Name(s) / Phone #: Nestor Rivera	Project Manager:	Attention:	

SGS Accutest Sample #	Field ID / Point of Collection	MECHID Vial #	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	DI Water	MEOH	ENCORE	VMAVPH	BMAEPHR	LAB USE ONLY
-1	MW-3		6/16/16	1545	NR	GW	5	5								X	X	
-2	MW-5		6/17/16	1110	NR	GW	5	5								X	X	
-3	MW-13		6/17/16	1243	NR	GW	4	4								X	X	
-4	BR-4		6/17/16	1505	NR	GW	5	5								X	X	
-5	MW-16		6/17/16	1602	NR	GW	5	5								X	X	
-6	MW-9		6/17/16	1834	NR	GW	0											
-6	MW-23S		6/20/16	1235	NR	GW	5	5								X	X	
-7	MW-21S		6/20/16	1547	NR	GW	5	5								X	X	

INITIAL ASESSMENT [signature]

LABEL VERIFICATION [signature]

Turnaround Time (Business days)

- [X] Std. 10 Business Days
- [ ] 5 Day RUSH
- [ ] 3 Day RUSH
- [ ] 2 Day RUSH
- [ ] 1 Day RUSH
- [ ] other

Approved By (SGS Accutest PM): / Date:

Emergency & Rush TIA data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [X] FULL T1 (Level 3+4)
- [ ] NJ Reduced
- [ ] Commercial "C"
- [ ] NJ Data of Known Quality Protocol Reporting
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] State Forms
- [ ] EDD Format
- [ ] Other

Commercial "A" = Results Only, Commercial "B" = Results + QC Summary
NJ Reduced = Results + QC Summary + Partial Raw data

Comments / Special Instructions

Loc. 19D, 5J4

Sample inventory is verified upon receipt in the Laboratory

Sample Custody must be documented below each time samples change possession, including courier delivery. 09:45

Relinquished by:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1 [signature]	6/20/16 1500	1 Fed EX	2	6/20/16	2 [signature]
3		3	4		4
5		5	Custody Seal # 12,418	Preserved where applicable	Cooler Temp. 5.0, 3.5

MC46487: Chain of Custody
Page 1 of 3

EXECUTIVE NARRATIVE

SDG No:	**MC46487**	Laboratory:	**Accutest, Massachusetts**
Analysis:	**MADEP VPH**	Number of Samples:	**7**
Location:	BMSMC, Building 5 Area Humacao, PR		

SUMMARY: **Seven (7) samples were analyzed for Volatiles TPHC Ranges by method MADEP VPH. Samples were validated following the METHOD FOR THE DETERMINATION OF VOLATILE PETROLEUM HYDROCARBONS (VPH) quality control criteria, Massachusetts Department of Environmental Protection, Revision 1.1 (2004). Also the general validation guidelines promulgated by the USEPA Hazardous Wastes Support Section. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.**

Results are valid and can be used for decision making purposes.

Critical issues:	**None**
Major:	**None**
Minor:	**None**

Critical findings:	**None**
Major findings:	**None**
Minor findings:	**None**

COMMENTS: Results are valid and can be used for decision making purposes.

Reviewers Name: Rafael Infante
Chemist License 1888

Signature:

Date: July 17, 2016

SAMPLE ORGANIC DATA SAMPLE SUMMARY

Sample ID: MC46487-1
Sample location: BMSMC Building 5 Area
Sampling date: 6/16/2016
Matrix: Groundwater

METHOD: MADEP VPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	32.8	ug/L	1	J	UJ	Yes
Ç9 - C12 Aliphatics (Unadj.)	342	ug/L	1	-	-	Yes
Ç9 - C10 Aromatics (Unadj.)	232	ug/L	1	-	-	Yes
Ç5 - C8 Aliphatics	32.5	ug/L	1	J	UJ	Yes
Ç9 - C12 Aliphatics	108	ug/L	1	-	-	Yes

Sample ID: MC46487-2
Sample location: BMSMC Building 5 Area
Sampling date: 6/17/2016
Matrix: Groundwater

METHOD: MADEP VPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	36.1	ug/L	1	J	UJ	Yes
Ç9 - C12 Aliphatics (Unadj.)	476	ug/L	1	-	-	Yes
Ç9 - C10 Aromatics (Unadj.)	55.3	ug/L	1	-	-	Yes
Ç5 - C8 Aliphatics	25.9	ug/L	1	J	UJ	Yes
Ç9 - C12 Aliphatics	84.6	ug/L	1	-	-	Yes

Sample ID: MC46487-3
Sample location: BMSMC Building 5 Area
Sampling date: 6/17/2016
Matrix: Groundwater

METHOD: MADEP VPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç9 - C12 Aliphatics (Unadj.)	31.7	ug/L	1	J	UJ	Yes
Ç9 - C10 Aromatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç5 - C8 Aliphatics	50	ug/L	1	-	U	Yes
Ç9 - C12 Aliphatics	50	ug/L	1	-	U	Yes

Sample ID: MC46487-4
Sample location: BMSMC Building 5 Area
Sampling date: 6/17/2016
Matrix: Groundwater

METHOD: MADEP VPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç9 - C12 Aliphatics (Unadj.)	37.2	ug/L	1	J	UJ	Yes
Ç9 - C10 Aromatics (Unadj.)	30.6	ug/L	1	J	UJ	Yes
Ç5 - C8 Aliphatics	50	ug/L	1	-	U	Yes
Ç9 - C12 Aliphatics	50	ug/L	1	-	U	Yes

Sample ID: MC46487-5
Sample location: BMSMC Building 5 Area
Sampling date: 6/17/2016
Matrix: Groundwater

METHOD: MADEP VPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç9 - C12 Aliphatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç9 - C10 Aromatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç5 - C8 Aliphatics	50	ug/L	1	-	U	Yes
Ç9 - C12 Aliphatics	50	ug/L	1	-	U	Yes

Sample ID: MC46487-6
Sample location: BMSMC Building 5 Area
Sampling date: 6/20/2016
Matrix: Groundwater

METHOD: MADEP VPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç9 - C12 Aliphatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç9 - C10 Aromatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç5 - C8 Aliphatics	50	ug/L	1	-	U	Yes
Ç9 - C12 Aliphatics	50	ug/L	1	-	U	Yes

Sample ID: MC46487-7
Sample location: BMSMC Building 5 Area
Sampling date: 6/20/2016
Matrix: Groundwater

METHOD: MADEP VPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç5 - C8 Aliphatics (Unadj.)	50	ug/L	1	-	UJ	Yes
Ç9 - C12 Aliphatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç9 - C10 Aromatics (Unadj.)	50	ug/L	1	-	U	Yes
Ç5 - C8 Aliphatics	50	ug/L	1	-	U	Yes
Ç9 - C12 Aliphatics	50	ug/L	1	-	U	Yes

DATA REVIEW WORKSHEETS

Type of validation Full:__X____ Limited:_____

Project Number:_MC46487_____
Date:__06/16-20/2016_____
Shipping date:_____06/20/2016_____
EPA Region:_____2_____

REVIEW OF VOLATILE PETROLEUM HYDROCARBON (VPHs) PACKAGE

The following guidelines for evaluating volatile organics were created to delineate required validation actions. This document will assist the reviewer in using professional judgment to make more informed decision and in better serving the needs of the data users. The sample results were assessed according to the data validation guidance documents in the following order of precedence METHOD FOR THE DETERMINATION OF VOLATILE PETROLEUM HYDROCARBONS (VPH), Massachusetts Department of Environmental Protection, Revision 1.1 (2004). Also the general validation guidelines promulgated by the USEPA Hazardous Wastes Support Section. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

The hardcopied (laboratory name) _Accutest_Laboratories_____ data package received has been reviewed and the quality control and performance data summarized. The data review for SVOCs included:

Lab. Project/SDG No.: __MC46487_____ Sample matrix: __Groundwater_____
No. of Samples: _____7_____
Field blank No.: _____-_____
Equipment blank No.: ___-_____
Trip blank No.: _____-_____
Field duplicate No.: _____-_____

__X____ Data Completeness
__X____ Holding Times
__N/A__ GC/MS Tuning
__N/A__ Internal Standard Performance
__X____ Blanks
__X____ Surrogate Recoveries
__X____ Matrix Spike/Matrix Spike Duplicate
___X__ Laboratory Control Spikes
___X__ Field Duplicates
___X__ Calibrations
___X__ Compound Identifications
___X__ Compound Quantitation
___X__ Quantitation Limits

Overall Comments: _Volatiles_by_GC_by_Method_MADEP_VPH,_REV_1.1.__ (C5_to_C12_Aliphatics;_C9_to_C10_Aromatics)_____

Definition of Qualifiers:

J- Estimated results
U- Compound not detected
R- Rejected data
UJ- Estimated nondetect

Reviewer:_____
Date:_07/17/2016_____

DATA REVIEW WORKSHEETS

All criteria were met __x___
Criteria were not met and/or see below _____

I. DATA COMPLETNESS
A. Data Package:

MISSING INFORMATION	DATE LAB. CONTACTED	DATE RECEIVED

B. Other Discrepancies:

All criteria were met ___X___
Criteria were not met and/or see below _____

HOLDING TIMES
The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of extraction, and subsequently from the time of extraction to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

SAMPLE ID	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	ACTION
Samples analyzed within method recommended holding time				

Criteria

Preservation:

Samples analyzed with ambient purge temperature: Samples must be acidified to a pH of 2.0 or less at the time of collection.
Samples analyzed with heated purge temperature: Samples must be treated to a pH of 11.0 or greater at the time of collection.
Methanol preservation of soil/sediment samples is mandatory. Methanol (purge-and-trap grade) must be added to the sample vial before or immediately after sample collection. In lieu of the in-field preservation of samples with methanol, soil samples may be obtained in specially-designed air tight sampling devices, provided that the samples are extruded and preserved in methanol within 48 hours of collection.

Holding times:

Aqueous samples using ambient or heated purge - analyze within 14 days.
Soil/sediment samples - analysis within 28 days.

Cooler temperature (Criteria: 4 ± 2 °C):___5°C_____

Actions: Qualify positive results/non-detects as follows:

If holding times are exceeded, estimate positive results (J) and nondetects (UJ).
If holding times are grossly exceeded, use professional judgment to qualify data. The data reviewer may choose to estimate positive results (J) and rejects nondetects (R).
If samples were not at the proper temperature (> 10°C) or improperly preserved, use professional judgment to qualify the results.

All criteria were met ___X___
Criteria were not met and/or see below _____

CALIBRATIONS VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration:___01/12/16_____

Dates of initial calibration verification:__01/12/16_

Instrument ID numbers:_____GCAB_____

Matrix/Level:_____ AQUEOUS/MEDIUM_____

DATE	LAB FILE ID#	ANALYTE	CRITERIA OUT RFs, %RSD, %D, r	SAMPLES AFFECTED
Initial and initial calibration verification meet method specific requirements				

Criteria- ICAL

- Five point calibration curve.
- The percent relative standard deviation (%RSD) of the calibration factor must be equal to or less than 25% over the working range for the analyte of interest. When this condition is met, linearity through the origin may be assumed, and the average calibration factor is used in lieu of a calibration curve.
- A collective calibration factor must also be established for each hydrocarbon range of interest. Calculate the collective CFs for C5-C8 Aliphatic Hydrocarbons and C9-C12 Aliphatic Hydrocarbons using the FID chromatogram. Calculate the collective CF for the C9-C10 Aromatic Hydrocarbons using the PID chromatogram. Tabulate the summation of the peak areas of all components in that fraction against the total concentration injected. The %RSD of the calibration factor must be equal to or less than 25% over the working range for the hydrocarbon range of interest.

Criteria- CCAL

- At a minimum, the working calibration factor must be verified on each working day, after every 20 samples, and at the end of the analytical sequence by the injection of a mid-level continuing calibration standard to verify instrument performance and linearity.
- If the percent difference (%D) for any analyte varies from the predicted response by more than ±25%, a new five-point calibration must be performed for that analyte. Greater percent differences are permissible for n-nonane. If the %D for n-nonane is greater than 30, note the nonconformance in the case narrative. It

should be noted that the %Ds are calculated when CFs are used for the initial calibration and percent drifts are calculated when calibration curves using linear regression are used for the initial calibration.

Actions:

If %RSD > 25% for target compounds or a correlation coefficient < 0.99, estimate positive results (J) and use professional judgment to qualify nondetects.
If % D > 25% (> 30 for nonane), estimate positive results (J) and nondetects (UJ).

CALIBRATIONS VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration:_____01/12/16_____

Dates of continuing calibration verification:_06/22/16_____

Dates of final calibration verification:_____06/23/16_____

Instrument ID numbers:_____GCAB_____

Matrix/Level:_____AQUEOUS/MEDIUM_____

DATE	LAB FILE ID#	ANALYTE	CRITERIA OUT RFs, %RSD, %D, r	SAMPLES AFFECTED
Continuing and final calibration verification meet method specific requirements				

A separate worksheet should be filled for each initial curve

All criteria were met ___X___
Criteria were not met and/or see below _____

V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

The assessment of the blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply only to blanks associated with the samples, including trip, equipment, and laboratory blanks. If problems with any blanks exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data. A Laboratory Method Blank must be run after samples suspected of being highly contaminated to determine if sample carryover has occurred.

List the contamination in the blanks below. High and low levels blanks must be treated separately.

Laboratory blanks

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS

__METHOD BLANKS MEET THE METHOD SPECIFIC CRITERIA_____

Field/Trip/Equipment

A methanol trip blank or acidified reagent water trip blank **should** continually accompany each soil/sediment sample or water sample batch, respectively, during sampling, storage, and analysis.

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS

_NO_TRIP/FIELD/EQUIPMENT_BLANKS_ASSOCIATED_WITH_THIS_DATA_____
_PACKAGE._____

All criteria were met __X___
Criteria were not met and/or see below _____

V B. BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. Peaks must not be detected above the Reporting Limit within the retention time window of any analyte of interest. The hydrocarbon ranges must not be detected at a concentration greater than 10% of the most stringent MCP cleanup standard. Specific actions area as follows:

If the concentration is < sample quantitation limit (SQL) and < AL, report the compound as not detected (U) at the SQL.
If the concentration is ≥ SQL but < AL, report the compound as not detected (U) at the reported concentration.
If the concentration is > AL, report the concentration unqualified.

All criteria were met __X___
Criteria were not met and/or see below _____

SURROGATE SPIKE RECOVERIES

Laboratory performance of individual samples is established by evaluation of surrogate spike recoveries. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.
List the percent recoveries (%Rs) which do not meet the criteria for surrogate recovery.
Matrix: solid/aqueous

SAMPLE ID	SURROGATE COMPOUND	ACTION
	2,3,4-Trifluorotoluene	

_SURROGATE_STANDARD_RECOVERIES_WITHIN_LABORATORY_CONTROL____
_LIMITS_____

QC Limits* (Aqueous)
_____LL_to_UL___ _70_to_130_ ___to_____ ___to_____
QC Limits* (Solid)
_____LL_to_UL___ ____to_____ ___to_____ ___to_____

It is recommended that surrogate standard recoveries be monitored and documented on a continuing basis. At a minimum, when surrogate recovery from a sample, blank, or QC sample is less than 70% or more than 130%, check calculations to locate possible errors, check the fortifying standard solution for degradation, and check changes in instrument performance.

If the cause cannot be determined, reanalyze the sample unless one of the following exceptions applies:

(1) Obvious interference is present on the chromatogram (e.g., unresolved complex mixture);
(2) Percent moisture of associated soil/sediment sample is >25% and surrogate recovery is >10%; or
(3) The surrogate exhibits high recovery and associated target analytes or hydrocarbon ranges are not detected in sample.

If a sample with a surrogate recovery outside of the acceptable range is not reanalyzed based on any of these aforementioned exceptions, this information must be noted on the data report form and discussed in the Executive Report. Analysis of the sample on dilution may diminish matrix-related surrogate recovery problems. This approach can be used as long as the reporting limits to evaluate applicable MCP standards can still be achieved with the dilution. If not, reanalysis without dilution must be performed.

All criteria were met __X___
Criteria were not met and/or see below _____

VII. A MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples.

At the request of the data user, and in consideration of sample matrices and data quality objectives, matrix spikes and matrix duplicates may be analyzed with every batch of 20 samples or less per matrix.

- **Matrix duplicate** - Matrix duplicates are prepared by analyzing one sample in duplicate. The purpose of the matrix duplicates is to determine the homogeneity of the sample matrix as well as analytical precision. The RPD of detected results in the matrix duplicate samples must not exceed 50 when the results are greater than 5x the reporting limit.
- The desired spiking level is 50% of the highest calibration standard. However, the total concentration in the MS (including the MS and native concentration in the unspiked sample) should not exceed 75% of the highest calibration standard in order for a proper evaluation to be performed. The purpose of the matrix spike is to determine whether the sample matrix contributes bias to the analytical results. The corrected concentrations of each analyte within the matrix spiking solution must be within 70 - 130% of the true value. Lower recoveries of n-nonane are permissible (if included in the calibration of the C9-C12 aliphatic range), but must be noted in the narrative if <30%.

MS/MSD Recoveries and Precision Criteria

Sample ID:_MC46489-2_MS/MSD_____ Matrix/Level:_Groundwater_____

List the %Rs, RPD of the compounds which do not meet the QC criteria.

MS OR MSD	COMPOUND	% R	RPD	QC LIMITS	ACTION

Note: MS/MSD % recoveries and RPD within laboratory control limits.

All criteria were met __X___
Criteria were not met and/or see below _____

No action is taken on MS/MSD results alone to qualify the entire case. However, used informed professional judgment, the data reviewer may use the MS/MSD results in conjunction with other QC criteria and determine the need for some qualification of the data. In those instances where it can be determined that the results of the MS/MSD affect only the sample spiked, the qualification should be limited to this sample alone. However, it may be determined through the MS/MSD results that the laboratory is having a systematic problem in the analysis of one or more analytes, which affects the associated samples.

2. MS/MSD – Unspiked Compounds

List the concentrations of the unspiked compounds and determine the % RSDs of these compounds in the unspiked sample, matrix spike, and matrix spike duplicate.

COMPOUND	CONCENTRATION SAMPLE	MS	MSD	%RPD	ACTION

Criteria: None specified, use %RSD ≤ 50 as professional judgment.

Actions:

If the % RSD > 50, qualify the results in the spiked sample as estimate (J).
If the % RSD is not calculable (NC) due to nondetect value in the sample, MS, and/or MSD, use professional judgment to qualify sample data.

A separate worksheet should be used for each MS/MSD pair.

All criteria were met __X___
Criteria were not met and/or see below _____

VIII. LABORATORY CONTROL SAMPLE (LCS/LCSD) ANALYSIS

This data is generated to determine accuracy of the analytical method for various matrices.

1. LCS Recoveries Criteria

List the %R of compounds which do not meet the criteria

LCS ID	COMPOUND	% R	QC LIMIT	ACTION
__LCS_RECOVERY_WITHIN_LABORATORY_CONTROL_LIMTS_____				

Criteria:

* Refer to QAPP for specific criteria.
* The spike recovery must be between 70% and 130%. Lower recoveries of n-nonane are permissible (if included in the calibration of the C9-C12 aliphatic range). If the recovery of n-nonane is <30%, note the nonconformance in the executive narrative.

Actions:

Actions on LCS recovery should be based on both the number of compounds that are outside the %R criteria and the magnitude of the excedance of the criteria.

If the %R of the analyte is > UL, qualify all positive results (j) for the affected analyte in the associated samples and accept nondetects.
If the %R of the analyte is < LL, qualify all positive results (j) and reject (R) nondetects for the affected analyte in the associated samples.
If more than half the compounds in the LCS are not within the required recovery criteria, qualify all positive results as (J) and reject nondetects (R) for all target analyte(s) in the associated samples.

2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each matrix (1 per 20 samples per matrix)? Yes or No.
If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify data accordingly. Discuss any actions below and list the samples affected. Discuss the actions below:

All criteria were met __N/A___
Criteria were not met and/or see below _____

IX. FIELD/LABORATORY DUPLICATE PRECISION

Sample IDs:_____-_____ Matrix:_____-_____

Field/laboratory duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which measures only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
No field/laboratory duplicate analyzed with this data package. MS/MSD % recovery RPD used to assess accuracy. RPD within laboratory and validation guidance document criteria (+ 50 %) for analytes detected above reporting limits.					

Criteria:

The project QAPP should be reviewed for project-specific information.
RPD $\pm$ 30% for aqueous samples, RPD $\pm$ 50 % for solid samples if results are $\geq$ SQL.
If both samples and duplicate are <5 SQL, the RPD criteria is doubled.

SQL = soil quantitation limit

Actions:

If both the sample and the duplicate results are nondetects (ND), the RPD is not calculable (NC). No action is needed.

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria.

If one sample result is not detected and the other is $\geq$ 5x the SQL qualify (J/UJ).

Note: If SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is < 5x the SQL, use professional judgment to determine if qualification is appropriate.

All criteria were met __X___
Criteria were not met and/or see below _____

XI. COMPOUND IDENTIFICATION

The compound identification evaluation is to verify that the laboratory correctly identified target analytes as well as tentatively identified compounds (TICs).

1. Verify that the target analytes were within the retention time windows.

   - Retention time windows must be re-established for each Target VPH Analyte each time a new GC column is installed, and must be verified and/or adjusted on a daily basis.
   - Coelution of the m- and p- xylene isomers is permissible.
   - All surrogates must be adequately resolved from individual Target Analytes included in the VPH Component Standard.
   - For the purposes of this method, adequate resolution is assumed to be achieved if the height of the valley between two peaks is less than 25% of the average height of the two peaks.
   - The n-pentane (C5) and MtBE peaks must be adequately resolved from any solvent front that may be present on the FID and PID chromatograms, respectively.

   Note: Target analytes were within the retention time window.

2. If target analytes and/or TICs were not correctly identified, request that the laboratory resubmit the corrected data.

All criteria were met __X___
Criteria were not met and/or see below _____

XII. QUANTITATION LIMITS AND SAMPLE RESULTS

The sample quantitation evaluation is to verify laboratory quantitation results.

1. In the space below, please show a minimum of one sample calculation:

MC46487-1 VPH (C5 – C7 Aliphatics) RF = 4.015×10^5

FID

[ ] = $(687796)/(4.015 \times 10^5)$

[ ] = 1.71 ppb Ok

MC46487-1 VPH (C9 – C10 Aromatics) RF = 0.958×10^6

PID

[ ] = $(222427183)/(0.958 \times 10^6)$

[ ] = 232.2 ppb Ok

2. If requested, verify that the results were above the laboratory method detection limit (MDLs).

3. If dilutions performed, were the SQLs elevated accordingly by the laboratory? List the affected samples and dilution factor in the table below.

SAMPLE ID	DILUTION FACTOR	REASON FOR DILUTION

If dilution was not performed and the results were above the concentration range, estimate results (J) for the affected compounds. List the affected samples/compounds:

_____

_____

EXECUTIVE NARRATIVE

SDG No:	**MC46487**	Laboratory:	**Accutest, Massachusetts**
Analysis:	**MADEP EPH**	Number of Samples:	**6**
Location:	BMSMC, Building 5 Area Humacao, PR		

SUMMARY: Six (6) samples were analyzed for Extractable Petroleum Hydrocarbons TPHC Ranges by method MADEP EPH. Samples were validated following the METHOD FOR THE DETERMINATION OF EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) quality control criteria, Massachusetts Department of Environmental Protection, Revision 1.1 (2004). Also the general validation guidelines promulgated by the USEPA Hazardous Wastes Support Section. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

Results are valid and can be used for decision making purposes.

Critical issues: **None**
Major: **None**
Minor: **None**

Critical findings: **None**
Major findings: **None**
Minor findings: 1. Sample MC46487-3 not reported. No explanation on data package.

2. Analytes detected in method blank. No action taken, blank concentration below the reporting limit. The laboratory qualified the results with a B qualifier. No further qualification required.

COMMENTS: Results are valid and can be used for decision making purposes.

Reviewers Name: Rafael Infante
Chemist License 1888

Signature: Rafael Infante

Date: July 17, 2016

SAMPLE ORGANIC DATA SAMPLE SUMMARY

Sample ID: MC46487-1
Sample location: BMSMC Building 5 Area
Sampling date: 6/16/2016
Matrix: Groundwater

METHOD: MADEP EPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	289	ug/L	1	B	-	Yes
Ç9 - C18 Aliphatics	30.7	ug/L	1	JB	UJ	Yes
Ç19 - C36 Aliphatics	34.6	ug/L	1	JB	UJ	Yes
Ç11 - C22 Aromatics	256	ug/L	1	B	-	Yes

Sample ID: MC46487-2
Sample location: BMSMC Building 5 Area
Sampling date: 6/17/2016
Matrix: Groundwater

METHOD: MADEP EPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	62.0	ug/L	1	JB	UJ	Yes
Ç9 - C18 Aliphatics	24.7	ug/L	1	JB	UJ	Yes
Ç19 - C36 Aliphatics	30.4	ug/L	1	JB	UJ	Yes
Ç11 - C22 Aromatics	59.2	ug/L	1	JB	UJ	Yes

Sample ID: MC46487-4
Sample location: BMSMC Building 5 Area
Sampling date: 6/17/2016
Matrix: Groundwater

METHOD: MADEP EPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	44.3	ug/L	1	JB	UJ	Yes
Ç9 - C18 Aliphatics	39.7	ug/L	1	JB	UJ	Yes
Ç19 - C36 Aliphatics	51.9	ug/L	1	JB	UJ	Yes
Ç11 - C22 Aromatics	44.3	ug/L	1	JB	UJ	Yes

Sample ID: MC46487-5
Sample location: BMSMC Building 5 Area
Sampling date: 6/17/2016
Matrix: Groundwater

METHOD: MADEP EPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	36.9	ug/L	1	JB	UJ	Yes
Ç9 - C18 Aliphatics	23.3	ug/L	1	JB	UJ	Yes
Ç19 - C36 Aliphatics	32.5	ug/L	1	JB	UJ	Yes
Ç11 - C22 Aromatics	36.9	ug/L	1	JB	UJ	Yes

Sample ID: MC46487-6
Sample location: BMSMC Building 5 Area
Sampling date: 6/20/2016
Matrix: Groundwater

METHOD: MADEP EPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	34.3	ug/L	1	JB	UJ	Yes
Ç9 - C18 Aliphatics	20.8	ug/L	1	JB	UJ	Yes
Ç19 - C36 Aliphatics	39.5	ug/L	1	JB	UJ	Yes
Ç11 - C22 Aromatics	33.8	ug/L	1	JB	UJ	Yes

Sample ID: MC46487-7
Sample location: BMSMC Building 5 Area
Sampling date: 6/20/2016
Matrix: Groundwater

METHOD: MADEP EPH

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ç11 - C22 Aromatics (Unadj.)	33.3	ug/L	1	JB	UJ	Yes
Ç9 - C18 Aliphatics	22.4	ug/L	1	J	UJ	Yes
Ç19 - C36 Aliphatics	40.0	ug/L	1	J	UJ	Yes
Ç11 - C22 Aromatics	32.8	ug/L	1	JB	UJ	Yes

DATA REVIEW WORKSHEETS

Type of validation Full:__X____ Project Number:_MC46487_____
Limited:_____ Date:__06/16-20/2016_____
Shipping date:__06/16/2016_____
EPA Region:_____2_____

REVIEW OF EXTRACTABLE PETROLEUM HYDROCARBON (EPHs) PACKAGE

The following guidelines for evaluating volatile organics were created to delineate required validation actions. This document will assist the reviewer in using professional judgment to make more informed decision and in better serving the needs of the data users. The sample results were assessed according to the data validation guidance documents in the following order of precedence METHOD FOR THE DETERMINATION OF EXTRACTABLE PETROLEUM HYDROCARBONS (VPH), Massachusetts Department of Environmental Protection, Revision 1.1 (2004). Also the general validation guidelines promulgated by the USEPA Hazardous Wastes Support Section. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

The hardcopied (laboratory name) _Accutest_Laboratories_____ data package received has been reviewed and the quality control and performance data summarized. The data review for SVOCs included:

Lab. Project/SDG No.: __MC46487_____ Sample matrix: _Groundwater/Soil_____
No. of Samples: _____6_____
Field blank No.: _____-_____
Equipment blank No.: _____-_____
Trip blank No.: _____-_____
Field duplicate No.: _____-_____

__X____ Data Completeness
__X____ Holding Times
__N/A__ GC/MS Tuning
__N/A__ Internal Standard Performance
__X____ Blanks
__X____ Surrogate Recoveries
__X____ Matrix Spike/Matrix Spike Duplicate
___X__ Laboratory Control Spikes
___X__ Field Duplicates
___X__ Calibrations
___X__ Compound Identifications
___X__ Compound Quantitation
___X__ Quantitation Limits

Overall Comments:
_Extractable_Petroleum_Hydrocarbons_by_GC_by_Method_MADEP_EPH,_REV_1.1.__
(C9_to_C36_Aliphatics;_C11_to_C22_(Aromatics)_____

Definition of Qualifiers:

J- Estimated results
U- Compound not detected
R- Rejected data
UJ- Estimated nondetect

Reviewer:_____
Date:_07/17/2016_____

DATA REVIEW WORKSHEETS

All criteria were met __x___
Criteria were not met and/or see below _____

I. DATA COMPLETNESS
A. Data Package:

MISSING INFORMATION	DATE LAB. CONTACTED	DATE RECEIVED

B. Other Discrepancies:

_Results_for_sample_MC46487-3_not_reported._

All criteria were met ___X___
Criteria were not met and/or see below _____

HOLDING TIMES
The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of extraction, and subsequently from the time of extraction to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

SAMPLE ID	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	ACTION
Samples extracted and analyzed within method recommended holding time				

Criteria

Preservation:

Aqueous samples must be acidified to a pH of 2.0 or less at the time of collection.
Soil samples must be cooled at 4 ± 2 °C immediately after collection.

Holding times:

Samples must be extracted within 14 days of collection, and analyzed within 40 days of extraction.

Cooler temperature (Criteria: 4 ± 2 °C):_____5°C_____

Actions: Qualify positive results/nondetects as follows:

If holding times are exceeded, estimate positive results (J) and nondetects (UJ).
If holding times are grossly exceeded, use professional judgment to qualify data. The data reviewer may choose to estimate positive results (J) and rejects nondetects (R).
If samples were not at the proper temperature (> 10°C) or improperly preserved, use professional judgment to qualify the results.

All criteria were met ___X___
Criteria were not met and/or see below _____

CALIBRATIONS VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration:_____06/22/16_____

Dates of initial calibration verification:_____06/22/13_____

Instrument ID numbers:_____GCDE_____

Matrix/Level:_____AQUEOUS/MEDIUM_____

DATE	LAB FILE ID#	ANALYTE	CRITERIA OUT RFs, %RSD, %D, r	SAMPLES AFFECTED
Initial and continuing calibration meet method specific requirements				

Criteria- ICAL

- Five point calibration curve.
- The percent relative standard deviation (%RSD) of the calibration factor must be equal to or less than 25% over the working range for the analyte of interest. When this condition is met, linearity through the origin may be assumed, and the average calibration factor is used in lieu of a calibration curve.
- A collective calibration factor must also be established for each hydrocarbon range of interest. Calculate the collective CFs for C9-C18 Aliphatic Hydrocarbons, C19-C36 Aliphatic Hydrocarbons, and C11-C22 Aromatic Hydrocarbons using the FID chromatogram. Tabulate the summation of the peak areas of all components in that fraction against the total concentration injected. The %RSD of the calibration factor must be equal to or less than 25% over the working range for the hydrocarbon range of interest.
    - The area for the surrogates must be subtracted from the area summation of the range in which they elute.
    - The areas associated with naphthalene and 2-methylnaphthalene in the aliphatic range standard must be subtracted from the uncorrected collective C9-C18 Aliphatic Hydrocarbon range area prior to calculating the CF.

Criteria- CCAL

- At a minimum, the working calibration factor must be verified on each working day, after every 20 samples or every 24 hours (whichever is more frequent), and at the end of the analytical sequence by the injection of a mid-level continuing calibration standard to verify instrument performance and linearity.
- If the percent difference (%D) for any analyte varies from the predicted response by more than ±25%, a new five-point calibration must be performed for that analyte. Greater percent differences are permissible for n-nonane. If the %D for n-nonane is greater than 30, note the nonconformance in the case narrative. It should be noted that the %Ds are calculated when CFs are used for the initial calibration and percent drifts are calculated when calibration curves using linear regression are used for the initial calibration.

Actions:

If %RSD > 25% for target compounds or a correlation coefficient < 0.99, estimate positive results (J) and use professional judgment to qualify nondetects.
If % D > 25% (> 30 for nonane), estimate positive results (J) and nondetects (UJ).

CALIBRATIONS VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration:_____06/22/16_____

Dates of continuing calibration verification:___06/28/15_____

Dates of final calibration verification:_____06/28/16_____

Instrument ID numbers:_____GCDE_____

Matrix/Level:_____AQUEOUS/MEDIUM_____

DATE	LAB FILE ID#	ANALYTE	CRITERIA OUT RFs, %RSD, %D, r	SAMPLES AFFECTED
Initial and continuing calibration meet method specific requirements				

A separate worksheet should be filled for each initial curve

All criteria were met _____
Criteria were not met and/or see below ___X___

V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

The assessment of the blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply only to blanks associated with the samples, including trip, equipment, and laboratory blanks. If problems with any blanks exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data. A Laboratory Method Blank must be run after samples suspected of being highly contaminated to determine if sample carryover has occurred.

List the contamination in the blanks below. High and low levels blanks must be treated separately.

Laboratory blanks

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
_METHOD BLANKS MEET THE METHOD SPECIFIC CRITERIA_EXCEPT_ __FOR_THE_CASES_DESCRIBED_IN_THIS_DOCUMENT._____				
_06/28/16_____	OP47926-MB__	Aqueous/low__	C11-C22_(Aromatics)___	32.3_ug/L____
_06/28/16_____	OP47926-MB__	Aqueous/low__	C9-C18_(Aliphatics)____	23.4_ug/L____
_06/28/16_____	OP47926-MB__	Aqueous/low__	C19-C36_(Aliphatics)___	32.3_ug/L____

Note: No action taken, blank concentration below the reporting limit. The laboratory qualified the results with a B qualifier. No further qualification required.

Field/Trip/Equipment

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
_NO_TRIP/FIELD/EQUIPMENT_BLANKS_ANALYZED_ASSOCIATED_WITH_THIS___ _DATA_PACKAGE._____				

All criteria were met __X___
Criteria were not met and/or see below _____

V B. BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. Peaks must not be detected above the Reporting Limit within the retention time window of any analyte of interest. The hydrocarbon ranges must not be detected at a concentration greater than 10% of the most stringent MCP cleanup standard. Specific actions area as follows:

If the concentration is < sample quantitation limit (SQL) and < AL, report the compound as not detected (U) at the SQL.
If the concentration is ≥ SQL but < AL, report the compound as not detected (U) at the reported concentration.
If the concentration is > AL, report the concentration unqualified.

All criteria were met __X___
Criteria were not met and/or see below _____

SURROGATE SPIKE RECOVERIES

Laboratory performance of individual samples is established by evaluation of surrogate spike recoveries. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.
List the percent recoveries (%Rs) which do not meet the criteria for surrogate recovery.
Matrix: solid/aqueous

SAMPLE ID	SURROGATE COMPOUND				ACTION
	S1	S2	S3	S4	
_SURROGATE_STANDARDS_RECOVERIES_WITHIN_LABORATORY_CONTROL__ _LIMITS._____					
_____					
_____					
_____					
_____					

S1 = o-Terphenyl 40-140% S2 = 2-Fluorobiphenyl 40-140%
S3 = 1-Chlorooctadecane 40-140% S4 = 2-Bromonaphthalene 40-140%

QC Limits (%)* (Aqueous)
_LL_to_UL_ _40_to_140_ _40_to_140_ _40_to_140_ _40_to_140_
QC Limits* (Solid)
_LL_to_UL_ ___to___ ____to_____ ___to_____ ___to_____

Note: No action, % recoveries within laboratory control limits in second column.

It is recommended that surrogate standard recoveries be monitored and documented on a continuing basis. At a minimum, when surrogate recovery from a sample, blank, or QC sample is less than 40% or more than 140%, check calculations to locate possible errors, check the fortifying standard solution for degradation, and check changes in instrument performance.

If the cause cannot be determined, reanalyze the sample unless one of the following exceptions applies:

(1) Obvious interference is present on the chromatogram (e.g., unresolved complex mixture);
(2) The surrogate exhibits high recovery and associated target analytes or hydrocarbon ranges are not detected in sample.

If a sample with a surrogate recovery outside of the acceptable range is not reanalyzed based on any of these aforementioned exceptions, this information must be noted on the data report form and discussed in the Executive Report. Analysis of the sample on dilution may diminish matrix-related surrogate recovery problems. This approach can be used as long as the reporting limits to evaluate applicable MCP standards can still be achieved with the dilution. If not, reanalysis without dilution must be performed.

All criteria were met _____
Criteria were not met and/or see below __N/A___

VII. A MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples.

At the request of the data user, and in consideration of sample matrices and data quality objectives, matrix spikes and matrix duplicates may be analyzed with every batch of 20 samples or less per matrix.

- **Matrix duplicate** - Matrix duplicates are prepared by analyzing one sample in duplicate. The purpose of the matrix duplicates is to determine the homogeneity of the sample matrix as well as analytical precision. The RPD of detected results in the matrix duplicate samples must not exceed 50 when the results are greater than 5x the reporting limit.
- The desired spiking level is 50% of the highest calibration standard. However, the total concentration in the MS (including the MS and native concentration in the unspiked sample) should not exceed 75% of the highest calibration standard in order for a proper evaluation to be performed. The purpose of the matrix spike is to determine whether the sample matrix contributes bias to the analytical results. The corrected concentrations of each analyte within the matrix spiking solution must be within 40 - 140% of the true value. Lower recoveries of n-nonane are permissible but must be noted in the narrative if <30%.

MS/MSD Recoveries and Precision Criteria

Sample ID:_____-_____ Matrix/Level:_____-_____

List the %Rs, RPD of the compounds which do not meet the QC criteria.

MS OR MSD	COMPOUND	% R	RPD	QC LIMITS	ACTION

Note: No MS/MSD sample analyzed with this data package. Blank spike/blank spike duplicate used to assess accuracy. % recoveries and RPD within laboratory control limits. No action taken.

All criteria were met __X___
Criteria were not met and/or see below _____

No action is taken on MS/MSD results alone to qualify the entire case. However, used informed professional judgment, the data reviewer may use the MS/MSD results in conjunction with other QC criteria and determine the need for some qualification of the data. In those instances where it can be determined that the results of the MS/MSD affect only the sample spiked, the qualification should be limited to this sample alone. However, it may be determined through the MS/MSD results that the laboratory is having a systematic problem in the analysis of one or more analytes, which affects the associated samples.

2. MS/MSD – Unspiked Compounds

List the concentrations of the unspiked compounds and determine the % RSDs of these compounds in the unspiked sample, matrix spike, and matrix spike duplicate.

COMPOUND	CONCENTRATION SAMPLE	MS	MSD	%RPD	ACTION

Criteria: None specified, use %RSD $\leq$ 50 as professional judgment.

Actions:

If the % RSD > 50, qualify the results in the spiked sample as estimate (J).
If the % RSD is not calculable (NC) due to nondetect value in the sample, MS, and/or MSD, use professional judgment to qualify sample data.

A separate worksheet should be used for each MS/MSD pair.

All criteria were met __X___
Criteria were not met and/or see below _____

VIII. LABORATORY CONTROL SAMPLE (LCS/LCSD) ANALYSIS

This data is generated to determine accuracy of the analytical method for various matrices.

1. LCS Recoveries Criteria

List the %R of compounds which do not meet the criteria

LCS ID	COMPOUND	% R	QC LIMIT	ACTION

__LCS_RECOVERY_WITHIN_LABORATORY_CONTROL_LIMTS_____

Criteria:

* Refer to QAPP for specific criteria.
* The spike recovery must be between 40% and 140%. Lower recoveries of n-nonane are permissible. If the recovery of n-nonane is <30%, note the nonconformance in the executive narrative. RPD between LCS/LCSD must be < 25%.

Actions:
Actions on LCS recovery should be based on both the number of compounds that are outside the %R and RPD criteria and the magnitude of the excedance of the criteria.

If the %R of the analyte is > UL, qualify all positive results (j) for the affected analyte in the associated samples and accept nondetects.
If the %R of the analyte is < LL, qualify all positive results (j) and reject (R) nondetects for the affected analyte in the associated samples.
If more than half the compounds in the LCS are not within the required recovery criteria, qualify all positive results as (J) and reject nondetects (R) for all target analyte(s) in the associated samples.

2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each matrix (1 per 20 samples per matrix)? Yes or No.
If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify data accordingly. Discuss any actions below and list the samples affected. Discuss the actions below:

All criteria were met _____
Criteria were not met and/or see below _N/A__

IX. FIELD/LABORATORY DUPLICATE PRECISION

Sample IDs:_____-_____ Matrix:_____-_____

Field/laboratory duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which measures only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
No field/laboratory duplicate analyzed with this data package. MS/MSD % recovery RPD used to assess precision. RPD within laboratory and validation guidance document criteria (± 50 % RPD) for analytes concentration ≥ 5 SQL.					

Criteria:

The project QAPP should be reviewed for project-specific information.
RPD ± 30% for aqueous samples, RPD ± 50 % for solid samples if results are ≥ SQL.
If both samples and duplicate are <5 SQL, the RPD criteria is doubled.

SQL = soil quantitation limit

Actions:

If both the sample and the duplicate results are nondetects (ND), the RPD is not calculable (NC). No action is needed.

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria.

If one sample result is not detected and the other is ≥ 5x the SQL qualify (J/UJ).

Note: If SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is < 5x the SQL, use professional judgment to determine if qualification is appropriate.

All criteria were met __X___
Criteria were not met and/or see below _____

XI. COMPOUND IDENTIFICATION

The compound identification evaluation is to verify that the laboratory correctly identified target analytes as well as tentatively identified compounds (TICs).

1. Verify that the target analytes were within the retention time windows.

   - Retention time windows must be re-established for each Target EPH Analyte each time a new GC column is installed, and must be verified and/or adjusted on a daily basis.
   - The n-nonane (n-C9) peak must be adequately resolved from the solvent front of the chromatographic run.
   - All surrogates must be adequately resolved from the Aliphatic Hydrocarbon and Aromatic Hydrocarbon standards.
   - For the purposes of this method, adequate resolution is assumed to be achieved if the height of the valley between two peaks is less than 25% of the average height of the two peaks.
   - The n-pentane (C5) and MtBE peaks must be adequately resolved from any solvent front that may be present on the FID and PID chromatograms, respectively.

1a. Aliphatic hydrocarbons range:

   - Determine the total area count for all peaks eluting 0.1 minutes before the retention time (Rt) for n-C9 and 0.01 minutes before the Rt for n-C19.
   - Determine the total area count for all peaks eluting 0.01 minutes before the Rt for n-C19 and 0.1 minutes after the Rt for n-C36.

Are the aliphatic hydrocarbons range properly determined? **Yes?** or No?

Comments:

1b. Aromatic hydrocarbons range:

   - Determine the total area count for all peaks eluting 0.1 minutes before the retention time (Rt) for naphthalene and 0.1 minutes after the Rt for benzo(g,h,i)perylene.
   - Determine the peak area count for the sample surrogate (OTP) and fractionation surrogate(s). Subtract these values from the collective area count value.

Are the aliphatic hydrocarbons range properly determined? **Yes?** or No?

Comments:

All criteria were met __X___
Criteria were not met and/or see below _____

2. If target analytes and/or TICs were not correctly identified, request that the laboratory resubmit the corrected data.

3. Breakthrough determination - Each sample (field and QC sample) must be evaluated for potential breakthrough on a sample specific basis by evaluating the % recovery of the fractionation surrogate (2-bromonaphthalene) and on a batch basis by quantifying naphthalene and 2-methylnaphthalene in both the aliphatic and aromatic fractions of the LCS and LCSD. **If either the concentration of naphthalene or 2-methylnaphthalene in the aliphatic fraction exceeds 5% of the total concentration for naphthalene or 2-methylnaphthalene in the LCS or LCSD, fractionation must be repeated on all archived batch extracts.**

NOTE: The total concentration of naphthalene or 2-methylnaphthalene in the LCS/LCSD pair includes the summation of the concentration detected in the aliphatic fraction and the concentration detected in the aromatic fraction.

Comments:__Concentration_in_the_aliphatic_fraction_<_5%_of_the_total_____
_concentration_for_naphthalene_and_2-methylnaphthalene_____
_____
_____
_____

4. **Fractionation Check Standard** – A fractionation check solution is prepared containing 14 alkanes and 17 PAHs at a nominal concentration of 200 ng/µl of each constituent. The Fractionation Check Solution must be used to evaluate the fractionation efficiency of each new lot of silica gel/cartridges, and establish the optimum hexane volume required to efficiently elute aliphatic hydrocarbons while not allowing significant aromatic hydrocarbon breakthrough. For each analyte contained in the fractionation check solution, excluding n-nonane, the Percent Recovery must be between 40 and 140%. A 30% Recovery is acceptable for n-nonane.

Is a fractionation check standard analyzed? Yes? or No?

Comments: Not applicable.

All criteria were met __X___
Criteria were not met and/or see below _____

XII. QUANTITATION LIMITS AND SAMPLE RESULTS

The sample quantitation evaluation is to verify laboratory quantitation results.

In order to demonstrate the absence of aliphatic mass discrimination, the response ratio of C28 to C20 must be at least 0.85. If <0.85, this nonconformance must be noted in the laboratory case narrative.

The chromatograms of Continuing Calibration Standards for aromatics must be reviewed to ensure that there are no obvious signs of mass discrimination.

Is aliphatic mass discrimination observed in the sample? Yes? or No?

Is aromatic mass discrimination observed in the sample? Yes? or No?

1. In the space below, please show a minimum of one sample calculation:

MC46487-1 EPH (C11 – C22, Aromatics) RF = 124800

[ ] = (16748267)/(124800)

[ ] = 134.2 ppb Ok

MC46487-1 EPH (C19 – C36, Aliphatics) RF = 77820

[ ] = (1251191)/(77820)

[ ] = 16.1 ppb Ok

2. If requested, verify that the results were above the laboratory method detection limit (MDLs).

3. If dilutions performed, were the SQLs elevated accordingly by the laboratory? List the affected samples and dilution factor in the table below.

SAMPLE ID	DILUTION FACTOR	REASON FOR DILUTION

If dilution was not performed, estimate results (J) for the affected compounds. List the affected samples/compounds:

_____

_____