CETIFICATION

SDG No:	JC23443	Laboratory:	Accutest, New Jersey
Site:	BMS-ICM, Humacao, PR	Matrix:	Groundwater

SUMMARY: Groundwater samples (Table 1) were collected on the BMSMC facility – BMS-ICM, Humacao, PR. The BMSMC facility is located in Humacao, PR. Samples were taken June 30-July 05, 2016 and were analyzed in Accutest Laboratory of Dayton, New Jersey for 1,4-Dioxane and Naphthalene. The results were reported under SDG No.: JC23443. Results were validated using 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
JC23443-1	OSGP4-GWD	Groundwater	1,-4-dioxane and Naphthalene (SIM)
JC23443-2	OSGP4-GWS	Groundwater	1,-4-dioxane and Naphthalene (SIM)
JC23443-3	OSGP5-GWD	Groundwater	1,-4-dioxane and Naphthalene (SIM)
JC23443-4	OSGP5-GWS	Groundwater	1,-4-dioxane and Naphthalene (SIM)
JC23443-4	OSGP5-GWS	Groundwater	1,-4-dioxane (Scan)
JC23443-5	OSGP6-GWD	Groundwater	1,-4-dioxane and Naphthalene (SIM)
JC23443-5	OSGP6-GWD	Groundwater	1,-4-dioxane (Scan)

Reviewer Name: Rafael Infante
Chemist License 1888

Signature: Rafael Infante

Date: July 24, 2016

ESTADO LIBRE ASOCIADO DE PUERTO RICO
Rafael Infante Méndez
LIC # 1888
QUIMICO LICENCIADO
1666

SGS Accutest

Report of Analysis

Client Sample ID:	OSGP4-GWD		
Lab Sample ID:	JC23443-1	Date Sampled:	06/30/16
Matrix:	AQ - Ground Water	Date Received:	07/06/16
Method:	SW846 8270D BY SIM SW846 3510C	Percent Solids:	n/a
Project:	BMS-ICM, Humacao, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3M62854.D	1	07/08/16	LK	07/06/16	OP95323A	E3M2968
Run #2							

	Initial Volume	Final Volume
Run #1	890 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
91-20-3	Naphthalene	ND	0.11	0.033	ug/l	
123-91-1	1,4-Dioxane	ND	0.11	0.055	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	69%		24-125%
321-60-8	2-Fluorobiphenyl	69%		19-127%
1718-51-0	Terphenyl-d14	79%		10-119%

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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:	OSGP4-GWS		
Lab Sample ID:	JC23443-2	Date Sampled:	06/30/16
Matrix:	AQ - Ground Water	Date Received:	07/06/16
Method:	SW846 8270D BY SIM SW846 3510C	Percent Solids:	n/a
Project:	BMS-ICM, Humacao, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3M62855.D	1	07/08/16	LK	07/06/16	OP95323A	E3M2968
Run #2							

	Initial Volume	Final Volume
Run #1	900 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
91-20-3	Naphthalene	ND	0.11	0.033	ug/l	
123-91-1	1,4-Dioxane	ND	0.11	0.054	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	68%		24-125%
321-60-8	2-Fluorobiphenyl	71%		19-127%
1718-51-0	Terphenyl-d14	79%		10-119%

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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:	OSGP5-GWD		
Lab Sample ID:	JC23443-3	Date Sampled:	07/01/16
Matrix:	AQ - Ground Water	Date Received:	07/06/16
Method:	SW846 8270D BY SIM SW846 3510C	Percent Solids:	n/a
Project:	BMS-ICM, Humacao, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3M62856.D	1	07/08/16	LK	07/06/16	OP95323A	E3M2968
Run #2							

	Initial Volume	Final Volume
Run #1	910 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
91-20-3	Naphthalene	ND	0.11	0.032	ug/l	
123-91-1	1,4-Dioxane	1.69	0.11	0.054	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	72%		24-125%
321-60-8	2-Fluorobiphenyl	72%		19-127%
1718-51-0	Terphenyl-d14	75%		10-119%

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LIC # 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:	OSGP5-GWS		
Lab Sample ID:	JC23443-4	Date Sampled:	07/05/16
Matrix:	AQ - Ground Water	Date Received:	07/06/16
Method:	SW846 8270D BY SIM SW846 3510C	Percent Solids:	n/a
Project:	BMS-ICM, Humacao, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3M62857.D	1	07/08/16	LK	07/06/16	OP95323A	E3M2968
Run #2	Z112258A.D	1	07/10/16	AC	07/06/16	OP95323A	EZ5607

	Initial Volume	Final Volume
Run #1	940 ml	1.0 ml
Run #2	940 ml	1.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
91-20-3	Naphthalene	ND	0.11	0.031	ug/l	
123-91-1	1,4-Dioxane	33.3 [a]	1.1	0.052	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	66%	78%	24-125%
321-60-8	2-Fluorobiphenyl	64%	65%	19-127%
1718-51-0	Terphenyl-d14	75%	66%	10-119%

(a) Result is from Run# 2

Colegio de Químicos de Puerto Rico
Rafael Infante Méndez
IQ # 1888
Químico 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:	OSGP6-GWD		
Lab Sample ID:	JC23443-5	Date Sampled:	07/05/16
Matrix:	AQ - Ground Water	Date Received:	07/06/16
Method:	SW846 8270D BY SIM SW846 3510C	Percent Solids:	n/a
Project:	BMS-ICM, Humacao, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4M66661.D	1	07/07/16	JJ	07/06/16	OP95328A	E4M2998
Run #2	P105954.D	1	07/08/16	BP	07/06/16	OP95328A	EP4679

	Initial Volume	Final Volume
Run #1	910 ml	1.0 ml
Run #2	910 ml	1.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
91-20-3	Naphthalene	ND	0.11	0.032	ug/l	
123-91-1	1,4-Dioxane	5.81 [a]	1.1	0.054	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	61%	95%	24-125%
321-60-8	2-Fluorobiphenyl	45%	89%	19-127%
1718-51-0	Terphenyl-d14	67%	80%	10-119%

(a) Result is from Run# 2

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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

ACCUTEST LABORATORIES

GW

CHAIN OF CUSTODY

PAGE 1 OF 1

NJ

2235 Route 130, Dayton, NJ 08810
TEL 732-329-0200 FAX 732-329-3499/3480
www.accutest.com

8098628882994
8098628882994

Accutest Job # JC23443

Client / Reporting Information

Company Name: Anderson Mulholland & Associates
Street Address: 2700 Westchester Avenue, Suite 417
City / State / Zip: Purchase NY 10577
Project Contact: Terry Taylor
Phone #: 914-251-8400
Sampler(s) Name(s): M. Rivera, R. Stuart, R. O'Reilly, T. Taylor

Project Information

Project Name: BMSMC Phase 2A Release Assessment
Street:
City / State: Humacao PR
Project #: 631
Client Purchase Order #:
Project Manager: Terry Taylor

Billing Information (if different from Report to):
Company Name:
Street Address:
City / State / Zip:
Attention:

Requested Analysis (see TEST CODE sheet)

Matrix Codes: 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

Accutest Sample #	Field ID / Point of Collection	MEOH Vial #	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	NaHSO4	H2SO4	NONE	Zn Water	MeOH	DI/CUNE	1,4-Dioxane and Naphthalene via 8270D SIM											LAB USE ONLY
1	OSGP4-GWD		6/30/16	1510	TT	GW	2					2				X											
2	OSGP4-GWS		6/30/16	1715	TT	GW	2					2				X											E76
3	OSGP5-GWD	*	7/1/16	1345	TT	GW	2					2				X											
4	OSGP5-GWS		7/5/16	1100	TT	GW	2					2				X											
5	OSGP6-GWD		7/5/16	1340	TT	GW	2					2				X											
	~~OSGP~~ AK					~~GW~~	~~2~~					~~2~~				X	AK										

Turnaround Time (Business days)

- ☐ Std. 15 Business Days
- ☐ Std. 10 Business Days (by Contract only)
- ☐ 10 Day RUSH
- ☐ 5 Day RUSH
- ☐ 3 Day EMERGENCY
- ☐ 2 Day EMERGENCY
- ☒ 1 Day EMERGENCY

Emergency & Rush TAT date quotes via Labtrack

Approved By (Accutest PM): / Date:
INITIAL ASSESSMENT 3B/BV
LABEL VERIFICATION: 0

Data Deliverable Information

- ☐ Commercial "A" (Level 1)
- ☐ Commercial "B" (Level 2)
- ☒ FULL T1 (Level 3+4)
- ☐ NJ Reduced
- ☐ Commercial "C"
- ☐ 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

*Time added in Sm
BV 7/6/16

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

Relinquished by:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1 [signature]	7/6/16 1200	1 Fed Ex	2 Fed Ex	7/6/16 9:30	2 [signature]
Relinquished by Sampler: 3	Date Time:	Received By: 3	Relinquished By: 4	Date Time:	Received By: 4
Relinquished By: 5	Date Time:	Received By: 5	Custody Seal # 380,198	Intact / Not intact	Preserved where applicable: ☐ On Ice: ☒ Cooler Temp: 4.3°C IRP

JC23443: Chain of Custody
Page 1 of 3

EXECUTIVE NARRATIVE

SDG No:	JC23443	Laboratory:	Accutest, New Jersey
Analysis:	SW846-8270D	Number of Samples:	5
Location:	BMS-ICM, Humacao, PR Humacao, PR		

SUMMARY: Five (5) samples were analyzed for the ABN TCL list following method SW846-8270D using the selective ion monitoring (SIM) technique. Naphthalene and 1,4-Dioxane were also analyzed by SW846-8270D- scanning mode in samples JC23443-4 and JC23443-5. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: EPA Hazardous Waste Support Section, SOP HW-35A, July 2015 –Revision 0. Semivolatile Data Validation. 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.** Initial and continuing calibration verifications meet the method and guidance document required performance criteria. No closing calibration verification included in data package. No action taken, professional judgment.

QC samples from other jobs were not validated.

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

No MS/MSD data included in the data package for the sample batch analyzed in the scanning mode. No action taken, professional judgment.

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

Reviewers Name: Rafael Infante
Chemist License 1888

Signature: Rafael Infante
Date: July 24, 2016

SAMPLE ORGANIC DATA SAMPLE SUMMARY

Sample ID: JC23443-1
Sample location: BMS-ICM, Humacao, PR
Sampling date: 6/30/2016
Matrix: Groundwater

METHOD: 8270D (SIM)

Naphthalene	0.11	ug/l	1	-	U	Yes
1,4-Dioxane	0.11	ug/l	1	-	U	Yes

Sample ID: JC23443-2
Sample location: BMS-ICM, Humacao, PR
Sampling date: 6/30/2016
Matrix: Groundwater

METHOD: 8270D (SIM)

Naphthalene	0.11	ug/l	1	-	U	Yes
1,4-Dioxane	0.11	ug/l	1	-	U	Yes

Sample ID: JC23443-3
Sample location: BMS-ICM, Humacao, PR
Sampling date: 7/1/2016
Matrix: Groundwater

METHOD: 8270D (SIM)

Naphthalene	0.11	ug/l	1	-	U	Yes
1,4-Dioxane	1.69	ug/l	1	-	-	Yes

Sample ID: JC23443-4
Sample location: BMS-ICM, Humacao, PR
Sampling date: 7/5/2016
Matrix: Groundwater

METHOD: 8270D (SIM)

Naphthalene	0.11	ug/l	1	-	U	Yes
1,4-Dioxane	-	-	-	-	-	-

Sample ID: JC23443-4
Sample location: BMS-ICM, Humacao, PR
Sampling date: 7/5/2016
Matrix: Groundwater

METHOD: 8270D (Scan)

1,4-Dioxane	33.3	ug/l	1	-	-	Yes

Sample ID: JC23443-5
Sample location: BMS-ICM, Humacao, PR
Sampling date: 7/5/2016
Matrix: Groundwater

METHOD: 8270D (SIM)

Naphthalene	0.11	ug/l	1	-	U	Yes
1,4-Dioxane	-	-	-	-	-	Yes

Sample ID: JC23443-5
Sample location: BMS-ICM, Humacao, PR
Sampling date: 7/5/2016
Matrix: Groundwater

METHOD: 8270D (Scan)

1,4-Dioxane	5.81	ug/l	1	-	-	Yes

DATA REVIEW WORKSHEETS

Project Number:_JC23443_____
Date:____ June_30-July_05,_2016_____
Shipping Date:___July_05,_2016_____
EPA Region:_____2_____

REVIEW OF SEMIVOLATILE ORGANIC 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 USEPA data validation guidance documents in the following order of precedence: EPA Hazardous Waste Support Section, SOP HW-35A, July 2015 –Revision 0. *Semivolatile Data Validation*. 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_____ data package received has been reviewed and the quality control and performance data summarized. The data review for SVOCs included:

Lab. Project/SDG No.: ____JC23443_____ Sample matrix: ____Groundwater___
No. of Samples: _____2_Scan/5_SIM_____

Trip blank No.: _____-_____
Field blank No.: _____-_____
Equipment blank No.:_____ _____-_____
Field duplicate No.:_____-_____

___X___ Data Completeness
___X___ Holding Times
___X___ GC/MS Tuning
___X___ 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:_Naphthalene_and_1,4-Dioxane_analyzed_by_method_SW846-8270D_(SIM)____
_Samples_JC23443-4_and_JC23443-5_analyzed_for_1,4-Dioxane_by_method_8270D_(Scan)_____
_____

Definition of Qualifiers:

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

Reviewer:_Rafael Defant_____
Date:___July_24,_2016_____

DATA REVIEW WORKSHEETS

DATA COMPLETENESS

MISSING INFORMATION	DATE LAB. CONTACTED	DATE RECEIVED

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 analysis.

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

SAMPLE ID	DATE SAMPLED	DATE EXTRACTED/ANALYZED	pH	ACTION
All samples extracted and analyzed within method recommended holding time. Samples properly preserved.				

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

Actions

Results will be qualified based on the criteria of the following Table:

Table 1. Holding Time Actions for Semivolatile Analyses

Matrix	Preserved	Criteria	Action	
			Detected Associated Compounds	Non-Detected Associated Compounds
Aqueous	No	≤ 7 days (for extraction) ≤ 40 days (for analysis)	Use professional judgment	
	No	> 7 days (for extraction) > 40 days (for analysis)	J	Use professional judgment
	Yes	≤ 7 days (for extraction) ≤ 40 days (for analysis)	No qualification	
	Yes	> 7 days (for extraction) > 40 days (for analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	UJ or R
Non-Aqueous	No	≤ 14 days (for extraction) ≤ 40 days (for analysis)	Use professional judgment	
	No	> 14 days (for extraction) > 40 days (for analysis)	J	Use professional judgment
	Yes	≤ 14 days (for extraction) ≤ 40 days (for analysis)	No qualification	
	Yes	> 14 days (for extraction) > 40 days (for analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	UJ or R

All criteria were met __X__
Criteria were not met see below _____

GC/MS TUNING

The assessment of the tuning results is to determine if the sample instrumentation is within the standard tuning QC limits

_X__ The DFTPP performance results were reviewed and found to be within the specified criteria.

_X__ DFTPP tuning was performed for every 12 hours of sample analysis.

If no, use professional judgment to determine whether the associated data should be accepted, qualified or rejected.

Notes: These requirements do not apply when samples are analyzed by the Selected Ion Monitoring (SIM) technique.

All mass spectrometer conditions must be identical to those used during the sample analysis. Background subtraction actions resulting in spectral distortion are unacceptable

Notes: No data should be qualified based of DFTPP failure.

The requirement to analyze the instrument performance check solution is optional when analysis of PAHs/pentachlorophenol is to be performed by the SIM technique.

List the samples affected: _____

Actions:

1. If sample are analyzed without a preceding valid instrument performance check or are analyzed 12 hours after the Instrument Performance Check, qualify all data in those samples as unusable (R).
2. If ion abundance criteria are not met, use professional judgment to determine to what extent the data may be utilized.
3. State in the Data Review Narrative, decisions to use analytical data associated with DFTPP instrument performance checks not meeting the contract requirements.
4. Use professional judgment to determine if associated data should be qualified based on the spectrum of the mass calibration compounds.

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

INITIAL CALIBRATION 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:___06/20/16_(SIM)_____
Instrument ID numbers:_____GCMS3M_____
Matrix/Level:_____Aqueous/low_____

Date of initial calibration:____06/20-21/16_(SIM)_____
Instrument ID numbers:_____GCMS4M_____
Matrix/Level:_____Aqueous/low_____

Date of initial calibration:____06/20/16_(Scan)_____
Instrument ID numbers:_____GCMSP_____
Matrix/Level:_____Aqueous/low_____

Date of initial calibration:____06/14-15/16_(Scan)_____
Instrument ID numbers:_____GCMSZ_____
Matrix/Level:_____Aqueous/low_____

DATE	LAB FILE ID#	CRITERIA OUT RFs, %RSD, %D, r	COMPOUND	SAMPLES AFFECTED
Initial and initial calibration verification meets the method and guidance validation document performance criteria. Other instrument used for the analysis of QC samples for this job. The QC samples analyzed were not validated				

Actions:

Qualify the initial calibration analytes listed in Table 2 using the following criteria:

Table 3. Initial Calibration Actions for Semivolatile Analysis

Criteria	Action	
	Detect	Non-detect
Initial Calibration not performed at specified frequency and sequence	Use professional judgment R	Use professional judgment R
Initial Calibration not performed at the specified concentrations	J	UJ
RRF < Minimum RRF in Table 2 for target analyte	Use professional judgment J+ or R	R
RRF ≥ Minimum RRF in Table 2 for target analyte	No qualification	No qualification
%RSD > Maximum %RSD in Table 2 for target analyte	J	Use professional judgment
%RSD ≤ Maximum %RSD in Table 2 for target analyte	No qualification	No qualification

Initial Calibration

Table 2. RRF, %RSD, and %D Acceptance Criteria in Initial Calibration and CCV for Semivolatil Analysis

Analyte	Minimum RRF	Maximum %RSD	Opening Maximum %D[1]	Opening Maximum %D[1]
1,4-Dioxane	0.010	40.0	±40.0	±50.0
Benzaldehyde	0.100	40.0	±40.0	±50.0
Phenol	0.080	20.0	±20.0	±25.0
Bis(2-chloroethyl)ether	0.100	20.0	±20.0	±25.0
2-Chlorophenol	0.200	20.0	±20.0	±25.0
2-Methylphenol	0.010	20.0	±20.0	±25.0
3-Methylphenol	0.010	20.0	±20.0	±25.0
2,2'-Oxybis-(1-chloropropane)	0.010	20.0	±25.0	±50.0
Acetophenone	0.060	20.0	±20.0	±25.0
4-Methylphenol	0.010	20.0	±20.0	±25.0
N-Nitroso-di-n-propylamine	0.080	20.0	±25.0	±25.0
Hexachloroethane	0.100	20.0	±20.0	±25.0
Nitrobenzene	0.090	20.0	±20.0	±25.0
Isophorone	0.100	20.0	±20.0	±25.0
2-Nitrophenol	0.060	20.0	±20.0	±25.0
2,4-Dimethylphenol	0.050	20.0	±25.0	±50.0
Bis(2-chloroethoxy)methane	0.080	20.0	±20.0	±25.0
2,4-Dichlorophenol	0.060	20.0	±20.0	±25.0
Naphthalene	0.200	20.0	±20.0	±25.0
4-Chloroaniline	0.010	40.0	±40.0	±50.0
Hexachlorobutadiene	0.040	20.0	±20.0	±25.0
Caprolactam	0.010	40.0	±30.0	±50.0
4-Chloro-3-methylphenol	0.040	20.0	±20.0	±25.0
2-Methylnaphthalene	0.100	20.0	±20.0	±25.0
Hexachlorocyclopentadiene	0.010	40.0	±40.0	±50.0
2,4,6-Trichlorophenol	0.090	20.0	±20.0	±25.0
2,4,5-Trichlorophenol	0.100	20.0	±20.0	±25.0
1,1'-Biphenyl	0.200	20.0	±20.0	±25.0

Analyte	Minimum RRF	Maximum %RSD	Opening Maximum %D[1]	Opening Maximum %D[1]
2-Chloronaphthalene	0.300	20.0	±20.0	±25.0
2-Nitroaniline	0.060	20.0	±25.0	±25.0
Dimethylphthalate	0.300	20.0	±25.0	±25.0
2,6-Dinitrotoluene	0.080	20.0	±20.0	±25.0
Acenaphthylene	0.400	20.0	±20.0	±25.0
3-Nitroaniline	0.010	20.0	±25.0	±50.0
Acenaphthene	0.200	20.0	±20.0	±25.0
2,4-Dinitrophenol	0.010	40.0	±50.0	±50.0
4-Nitrophenol	0.010	40.0	±40.0	±50.0
Dibenzofuran	0.300	20.0	±20.0	±25.0
2,4-Dinitrotoluene	0.070	20.0	±20.0	±25.0
Diethylphthalate	0.300	20.0	±20.0	±25.0
1,2,4,5-Tetrachlorobenzene	0.100	20.0	±20.0	±25.0
4-Chlorophenyl-phenylether	0.100	20.0	±20.0	±25.0
Fluorene	0.200	20.0	±20.0	±25.0
4-Nitroaniline	0.010	40.0	±40.0	±50.0
4,6-Dinitro-2-methylphenol	0.010	40.0	±30.0	±50.0
4-Bromophenyl-phenyl ether	0.070	20.0	±20.0	±25.0
N-Nitrosodiphenylamine	0.100	20.0	±20.0	±25.0
Hexachlorobenzene	0.050	20.0	±20.0	±25.0
Atrazine	0.010	40.0	±25.0	±50.0
Pentachlorophenol	0.010	40.0	±40.0	±50.0
Phenanthrene	0.200	20.0	±20.0	±25.0
Anthracene	0.200	20.0	±20.0	±25.0
Carbazole	0.050	20.0	±20.0	±25.0
Di-n-butylphthalate	0.500	20.0	±20.0	±25.0
Fluoranthene	0.100	20.0	±20.0	±25.0
Pyrene	0.400	20.0	±25.0	±50.0
Butylbenzylphthalate	0.100	20.0	±25.0	±50.0

Analyte	Minimum RRF	Maximum %RSD	Opening Maximum %D[1]	Opening Maximum %D[1]
3,3'-Dichlorobenzidine	0.010	40.0	± 40.0	± 50.0
Benzo(a)anthracene	0.300	20.0	± 20.0	± 25.0
Chrysene	0.200	20.0	± 20.0	± 50.0
Bis(2-ethylhexyl) phthalate	0.200	20.0	± 25.0	± 50.0
Di-n-octylphthalate	0.010	40.0	± 40.0	± 50.0
Benzo(b)fluoranthene	0.010	20.0	± 25.0	± 50.0
Benzo(k)fluoranthene	0.010	20.0	± 25.0	± 50.0
Benzo(a)pyrene	0.010	20.0	± 20.0	± 50.0
Indeno(1,2,3-cd)pyrene	0.010	20.0	± 25.0	± 50.0
Dibenzo(a,h)anthracene	0.010	20.0	± 25.0	± 50.0
Benzo(g,h,i)perylene	0.010	20.0	± 30.0	± 50.0
2,3,4,6-Tetrachlorophenol	0.040	20.0	± 20.0	± 50.0
Naphthalene	0.600	20.0	± 25.0	± 25.0
2-Methylnaphthalene	0.300	20.0	± 20.0	± 25.0
Acenaphthylene	0.900	20.0	± 20.0	± 25.0
Acenaphthene	0.500	20.0	± 20.0	± 25.0
Fluorene	0.700	20.0	± 25.0	± 50.0
Phenanthrene	0.300	20.0	± 25.0	± 50.0
Anthracene	0.400	20.0	± 25.0	± 50.0
Fluoranthene	0.400	20.0	± 25.0	± 50.0
Pyrene	0.500	20.0	± 30.0	± 50.0
Benzo(a)anthracene	0.400	20.0	± 25.0	± 50.0
Chyrsene	0.400	20.0	± 25.0	± 50.0
Benzo(b)fluoranthene	0.100	20.0	± 30.0	± 50.0
Benzo(k)fluoranthene	0.100	20.0	± 30.0	± 50.0
Benzo(a)pyrene	0.100	20.0	± 25.0	± 50.0
Indeno(1,2,3-cd)pyrene	0.100	20.0	± 40.0	± 50.0
Dibenzo(a,h)anthracene	0.010	25.0	± 40.0	± 50.0
Benzo(g,h,i)perylene	0.020	25.0	± 40.0	± 50.0

Pentachlorophenol	0.010	40.0	± 50.0	± 50.0
Deuterated Monitoring Compounds				
Analyte	**Minimum RRF**	**Maximum %RSD**	**Opening Maximum %D[1]**	**Closing Maximum %D**
1,4-Dioxane-d_8	0.010	20.0	± 25.0	± 50.0
Phenol-d_5	0.010	20.0	± 25.0	± 25.0
Bis-(2-chloroethyl)ether-d_8	0.100	20.0	± 20.0	± 25.0
2-Chlorophenol-d_4	0.200	20.0	± 20.0	± 25.0
4-Methylphenol-d_8	0.010	20.0	± 20.0	± 25.0
4-Chloroaniline-d_4	0.010	40.0	± 40.0	± 50.0
Nitrobenzene-d_5	0.050	20.0	± 20.0	± 25.0
2-Nitrophenol-d_4	0.050	20.0	± 20.0	± 25.0
2,4-Dichlorophenol-d_3	0.060	20.0	± 20.0	± 25.0
Dimethylphthalate-d_6	0.300	20.0	± 20.0	± 25.0
Acenaphthylene-d_8	0.400	20.0	± 20.0	± 25.0
4-Nitrophenol-d_4	0.010	40.0	± 40.0	± 50.0
Fluorene-d_{10}	0.100	20.0	± 20.0	± 25.0
4,6-Dinitro-2-methylphenol-d_2	0.010	40.0	± 30.0	± 50.0
Anthracene-d_{10}	0.300	20.0	± 20.0	± 25.0
Pyrene-d_{10}	0.300	20.0	± 25.0	± 50.0
Benzo(a)pyrene-d_{12}	0.010	20.0	± 20.0	± 50.0
Fluoranthene-d_{10} (SIM)	0.400	20.0	± 25.0	± 50.0
2-Methylnaphthalene-d_{10} (SIM)	0.300	20.0	± 20.0	± 25.0

[1] If a closing CCV is acting as an opening CCV, all target analytes must meet the requirements for an opening CCV.

Note: If analysis by SIM technique is requested for PAH/pentachlorophenols, calibration standards analyzed at 0.10, 0.20, 0.40, 0.80, and 1.0 ng/uL for each target compound of interest and the associated DMCs. Pentachlorophenol will require only a four point initial calibration at 0.20, 0.40, 0.80, and 1.0 ng/uL.

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

CONTINUING CALIBRATION 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:_____06/20/16_(SIM)_____
Date of initial calibration verification (ICV):_06/20-21/16_____
Date of continuing calibration verification (CCV):_07/08/16_____
Date of closing CCV:_____-_____
Instrument ID numbers:_____GCMS3M_____
Matrix/Level:_____Aqueous/low_____ _____

Date of initial calibration:_____06/20-21/16_(SIM)_____
Date of initial calibration verification (ICV):_06/21/16_____
Date of continuing calibration verification (CCV):_07/07/16;_07/09/16_____
Date of closing CCV:_____-_____
Instrument ID numbers:_____GCMS4M_____
Matrix/Level:_____Aqueous/low_____ _____

Date of initial calibration:_____06/14-15/16_(Scan)_____
Date of initial calibration verification (ICV):_06/15-16/16_____
Date of continuing calibration verification (CCV):_07/10/16_____
Date of closing CCV:_____-_____
Instrument ID numbers:_____GCMSZ_____
Matrix/Level:_____Aqueous/low_____ _____

Date of initial calibration:_____06/28/16_(Scan)_____
Date of initial calibration verification (ICV):_06/28-29/16_____
Date of continuing calibration verification (CCV):_07/08/16_____
Date of closing CCV:_____-_____
Instrument ID numbers:_____GCMSP_____
Matrix/Level:_____Aqueous/low_____ _____

DATE	LAB FILE ID#	CRITERIA OUT RFs, %RSD, %D, r	COMPOUND	SAMPLES AFFECTED

Note: Initial and continuing calibration verifications meet the method and guidance document required performance criteria. No closing calibration verification included in data package. No action taken, professional judgment.

Actions:

Notes: Verify that the CCV is run at the required frequency (an opening and closing CCV must be run within 12-hour period).

All DMCs must meet the RRF values given in Table 2. No qualification of the data is necessary on DMCs RRF and %RSD/%D alone. Use professional judgment to evaluate DMCs and %RSD/%D data in conjunction with DMCs recoveries to determine the need for qualification of the data.

Qualify the initial calibration analytes listed in Table 2 using the following criteria in the CCVs:

Table 4. CCV Actions for Semivolatile Analysis

Criteria for Opening CCV	Criteria for Closing CCV	Action	
		Detect	Non-detect
CCV not performed at required frequency and sequence	CCV not performed at required frequency	Use professional judgment R	Use professional judgment R
CCV not performed at specified concentration	CCV not performed at specified concentration	Use professional judgment	Use professional judgment
RRF < Minimum RRF in Table 2 for target analyte	RRF < Minimum RRF in Table 2 for target analyte	Use professional judgment J or R	R
RRF ≥ Minimum RRF in Table 2 for target analyte	RRF ≥ Minimum RRF in Table 2 for target analyte	No qualification	No qualification
%D outside the Opening Maximum %D limits in Table 2 for target analyte	%D outside the Closing Maximum %D limits in Table 2 for target analyte	J	UJ
%D within the inclusive Opening Maximum %D limits in Table 2 for target analyte	%D within the inclusive Closing Maximum %D limits in Table 2 for target analyte	No qualification	No qualification

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

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.

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

Notes: The concentration of non-target compounds in all blanks must be less than or equal to 10 ug/L.

The concentration of target compounds in all blanks must be less than its CRQL listed in the method.

Samples taken from a drinking water tap do not have and associated field blank.

Laboratory blanks

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
_No_target_analytes_detected_in_method_blanks._____				

Field/Equipment/Trip blank

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
_No_field/trip/equipment_blanks_analyzed_with_this_data_package._____				

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

BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

Qualify samples based on the criteria summarized in Table 5:

Table 5. Blank and TCLP/SPLP LEB Actions for Semivolatile Analysis

Blank Type	Blank Result	Sample Result	Action
Method, TCLP/SPLP LEB, Field	Detect	Non-detect	No qualification
	< CRQL	< CRQL	Report at CRQL and qualify as non-detect (U)
		≥ CRQL	Use professional judgment
	≥ CRQL	< CRQL	Report at CRQL and qualify as non-detect (U)
		≥ CRQL but < Blank Result	Report at sample results and qualify as non-detect (U) or as unusable (R)
		≥ CRQL and ≥ Blank Result	Use professional judgment
	Grossly high	Detect	Report at sample results and qualify as unusable (R)
	TIC > 5.0 ug/L (water) or 0.0050 mg/L (TCLP leachate) or TIC > 170 ug/Kg (soil)	Detect	Use professional judgment

List samples qualified

CONTAMINATION SOURCE/LEVEL	COMPOUND	CONC/UNITS	AL/UNITS	SQL	AFFECTED SAMPLES

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

SURROGATE SPIKE RECOVERIES – DEUTERATED MONITORING COMPOUNDS (DMCs)

Laboratory performance of individual samples is established by evaluation of surrogate spike recoveries – deuterated monitoring compounds. 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.

Notes: Recoveries for DMCs in samples and blanks must be within the limits specified in Table 6.

The recovery limits for any of the compounds listed in Table 6 may be expanded at any time during the period of performance if USEPA determines that the limits are too restrictive.

If a DMC is not added in the samples and blanks or the concentrations of DMCs in the samples and blank not the specified, use professional judgment in qualifying the data.

Table 7. DMC Actions for Semivolatile Analysis

Criteria	Action	
	Detect	Non-detect
%R < 10% (excluding DMCs with 10% as a lower acceptance limit)	J-	R
10% ≤ %R (excluding DMCs with 10% as a lower acceptance limit) < Lower Acceptance Limit	J-	UJ
Lower Acceptance limit ≤ %R ≤ Upper Acceptance Limit	No qualification	No qualification
%R > Upper Acceptance Limit	J+	No qualification

List the percent recoveries (%Rs) which do not meet the criteria for DMCs (surrogate) recovery.

Matrix:___Groundwater_____

SAMPLE ID **SURROGATE COMPOUND** **ACTION**

_____

_DMCs_meet_the_required_criteria._Non-deuterated_surrogates_added_to_the_samples_were_
_within_laboratory_recovery_limits._____

_____

_____

_____

_____

Table 8. Semivolatile DMCs and the Associated Target Analytes

1,4-Dioxane-d_8 (DMC-1)	**Phenol-d_5 (DMC-2)**	**Bis(2-Chloroethyl) ether-d_8 (DMC-3)**
1,4-Dioxane	Benzaldehyde Phenol	Bis(2-chloroethyl)ether 2,2'-Oxybis(1-chloropropane) Bis(2-chloroethoxy)methane
2-Chlorophenol-d_4 (DMC-4)	**4-Methylphenol-d_8 (DMC-5)**	**4-Chloroaniline-d_4 (DMC-6)**
2-Chlorophenol	2-Methylphenol 3-Methylphenol 4-Methylphenol 2,4-Dimethylphenol	4-Chloroaniline Hexachlorocyclopentadiene Dichlorobenzidine
Nitrobenzene-d_5 (DMC-7)	**2-Nitrophenol-d_4 (DMC-8)**	**2,4-Dichlorophenol-d_3 (DMC-9)**
Acetophenone N-Nitroso-di-n-propylamine Hexachloroethane Nitrobenzene 2,6-Dinitrotoluene 2,4-Dinitrotoluene N-Nitrosodiphenylamine	Isophorone 2-Nitrophenol	2,4-Dichlorophenol Hexachlorobutadiene Hexachlorocyclopentadiene 4-Chloro-3-methylphenol 2,4,6-Trichlorophenol 2,4,5-Trichlorophenol 1,2,4,5-Tetrachlorobenzene *Pentachlorophenol 2,3,4,6-Tetrachlorophenol
Dimethylphthalate-d_6 (DMC-10)	**Acenaphthylene-d_8 (DMC-11)**	**4-Nitrophenol-d_4 (DMC-12)**
Caprolactam 1,1'-Biphenyl Dimethylphthalate Diethylphthalate Di-n-butylphthalate Butylbenzylphthalate Bis(2-ethylhexyl) phthalate Di-n-octylphthalate	*Naphthalene *2-Methylnaphthalene 2-Chloronaphthalene *Acenaphthylene *Acenaphthene	2-Nitroaniline 3-Nitroaniline 2,4-Dinitrophenol 4-Nitrophenol 4-Nitroaniline

Fluorene-d_{10} (DMC-13)	**4,6-Dinitro-2-methylphenol-d_2 (DMC-14)**	**Anthracene-d_{10} (DMC-15)**
Dibenzofuran *Fluorene 4-Chlorophenyl-phenylether 4-Bromophenyl-phenylether Carbazole	4,6-Dinitro-2-methylphenol	Hexachlorobenzene Atrazine *Phenanthrene *Anthracene
Pyrene-d_{10} (DMC-16)	**Benzo(a)pyrene-d_{12} (DMC-17)**	
*Fluoranthene *Pyrene *Benzo(a)anthracene *Chrysene	3,3'-Dichlorobenzidine *Benzo(b)fluoranthene *Benzo(k)fluoranthene *Benzo(a)pyrene *Indeno(1,2,3-cd)pyrene *Dibenzo(a,h)anthracene *Benzo(g,h,i)perylene	

*Included in optional Target Analyte List (TAL) of PAHs and PCP only.

Table 9. Semivolatile SIM DMCs and the Associated Target Analytes

Fluoranthene-d10 (DMC-1)	**2-Methylnaphthalene-d10 (DMC-2)**
Fluoranthene	Naphthalene
Pyrene	2-Methylnaphthalene
Benzo(a)anthracene	Acenaphthylene
Chrysene	Acenaphthene
Benzo(b)fluoranthene	Fluorene
Benzo(k)fluoranthene	Pentachlorophenol
Benzo(a)pyrene	Phenanthrene
Indeno(1,2,3-cd)pyrene	Anthracene
Dibenzo(a,h)anthracene	
Benzo(g,h,i)perylene	

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. If any % R in the MS or MSD falls outside the designated range, the reviewer should determine if there are matrix effects, i.e. LCS data are within the QC limits but MS/MSD data are outside QC limit.

1. MS/MSD Recoveries and Precision Criteria

The laboratory should use one MS and a duplicate analysis of an unspiked field sample if target analytes are expected in the sample. If target analytes are not expected, MS/MSD should be analyzed.

NOTES: Data for MS and MSDs will not be present unless requested by the Region. Notify the Contract Laboratory COR if a field or trip blank was used for the MS and MSD.

For a Matrix Spike that does not meet criteria, apply the action to only the field sample used to prepare the Matrix Spike sample. If it is clearly stated in the data validation materials that the samples were taken through incremental sampling or some other method guaranteeing the homogeneity of the sample group, then the entire sample group may be qualified.

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

Sample ID:__JC23251-2_(SIM)_____ Matrix/Level:__Groundwater_____
Sample ID:__JC23294-1_(SIM)_____ Matrix/Level:__Groundwater_____

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

No MS/MSD data included in the data package for the scanning mode sample batch. No action taken, professional judgment.

* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
* If QC limits are not available, use limits of 70 – 130 %.

Actions:

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

MS/MSD criteria apply only to the unspiked sample, its dilutions, and the associated MS/MSD samples:

If the % R for the affected compounds were < LL (or 70 %), qualify positive results (J) and nondetects (UJ).
If the % R for the affected compounds were > UL (or 130 %), only qualify positive results (J).
If 25 % or more of all MS/MSD %R were < LL (or 70 %) or if two or more MS/MSD %Rs were < 10%, qualify all positive results (J) and reject nondetects (R).

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

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

INTERNAL STANDARD PERFORMANCE

The assessment of the internal standard (IS) parameter is used to assist the data reviewer in determining the condition of the analytical instrumentation.

List the internal standard area of samples which do not meet the criteria.

DATE	SAMPLE ID	IS OUT	IS AREA	ACCEPTABLE RANGE	ACTION

Internal area meets the required criteria of batch samples corresponding to this data package.

Action:

1. If an internal standard area count for a sample or blank is greater than 200.0% of the area for the associated standard (opening CCV or mid-point standard from initial calibration) (see Table 10 below):
   a. Qualify detects for compounds quantitated using that internal standard as estimated low (J-).
   b. Do not qualify non-detected associated compounds.
2. If an internal standard area count for a sample or blank is less than 20.0% of the area for the associated standard (opening CCV or mid-point standard from initial calibration):
   a. Qualify detects for compounds quantitated using that internal standard as estimated high (J+).
   b. Qualify non-detected associated compounds as unusable (R).
3. If an internal standard area count for a sample or blank is greater than or equal to 50.0%, and less than or equal to 200% of the area for the associated standard opening CCV or mid-point standard from initial calibration, no qualification of the data is necessary.
4. If an internal standard RT varies by more than 10.0 seconds: Examine the chromatographic profile for that sample to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Detects should not need to be qualified as unusable (R) if the mass spectral criteria are met.
5. If an internal standard RT varies by less than or equal to 10.0 seconds, no qualification of the data is necessary.

Note: Inform the Contract Laboratory Program Project Officer (CLP PO) if the internal standard performance criteria are grossly exceeded. Note in the Data Review Narrative potential effects on the data resulting from unacceptable internal standard performance.

State in the Data Review Narrative if the required internal standard compounds are not added to a sample or blank or if the required internal standard compound is not analyzed at the specified concentration.

Actions:

Table 10. Internal Standard Actions for Semivolatile Analysis

Criteria	Action	
	Detect	Non-detect
Area response < 20% of the opening CCV or mid-point standard CS3 from ICAL	J+	R
20% ≤ Area response < 50% of the opening CCV or mid-point standard CS3 from ICAL	J+	UJ
50% ≤ Area response ≤ 200% of the opening CCV or mid-point standard CS3 from ICAL	No qualification	No qualification
Area response > 200% of the opening CCV or mid-point standard CS3 from ICAL	J-	No qualification
RT shift between sample/blank and opening CCV or mid-point standard CS3 from ICAL > 10.0 seconds	R	R
RT shift between sample/blank and opening CCV or mid-point standard CS3 from ICAL < 10.0 seconds	No qualification	No qualification

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

TARGET COMPOUND IDENTIFICATION

Criteria:

Is the Relative Retention Times (RRTs) of reported compounds within ±0.06 RRT units of the standard RRT [opening Continuing Calibration Verification (CCV) or mid-point standard from the initial calibration]. **Yes?** or No?

List compounds not meeting the criteria described above:

Sample ID	Compounds	Actions
_____	_____	_____
_____	_____	_____
_____	_____	_____

Mass spectra of the sample compound and a current laboratory-generated standard [i.e., the mass spectrum from the associated calibration standard (opening CCV or mid-point standard from initial calibration)] must match according to the following criteria:

a. All ions present in the standard mass spectrum at a relative intensity greater than 10% must be present in the sample spectrum.
b. The relative intensities of these ions must agree within ±20% between the standard and sample spectra (e.g., for an ion with an abundance of 50% in the standard spectrum, the corresponding sample ion abundance must be between 30-70%).
c. Ions present at greater than 10% in the sample mass spectrum, but not present in the standard spectrum, must be evaluated by a reviewer experienced in mass spectral interpretation.

List compounds not meeting the criteria described above:

Sample ID	Compounds	Actions
_____	_____	_____
_Identified_compounds_meet_the_required_criteria____		_____
_____	_____	_____

Action:

1. The application of qualitative criteria for GC/MS analysis of target compounds requires professional judgment. It is up to the reviewer's discretion to obtain additional information from the laboratory. If it is determined that incorrect identifications were made, qualify all such data as unusable (R).

2. Use professional judgment to qualify the data if it is determined that cross-contamination has occurred.

3. Note in the Data Review Narrative any changes made to the reported compounds or concerns regarding target compound identifications. Note, for Contract Laboratory COR action, the necessity for numerous or significant changes.

TENTATIVELY IDENTIFIED COMPOUNDS (TICS)

NOTE: Tentatively identified compounds should only be evaluated when requested by a party from outside of the Hazardous Waste Support Section (HWSS).

List TICs

Sample ID	Compound	Sample ID	Compound

Action:

1. Qualify all TIC results for which there is presumptive evidence of a match (e.g. greater than or equal to 85% match) as tentatively identified (NJ), with approximated concentrations. TICs labeled "unknown" are qualified as estimated (J).
2. General actions related to the review of TIC results are as follows:
   a. If it is determined that a tentative identification of a non-target compound is unacceptable, change the tentative identification to "unknown" or another appropriate identification, and qualify the result as estimated (J).
   b. If all contractually-required peaks were not library searched and quantitated, the Region's designated representative may request these data from the laboratory.
3. In deciding whether a library search result for a TIC represents a reasonable identification, use professional judgment. If there is more than one possible match, report the result as "either compound X or compound Y". If there is a lack of isomer specificity, change the TIC result to a nonspecific isomer result (e.g., 1,3,5-trimethyl benzene to trimethyl benzene isomer) or to a compound class (e.g., 2-methyl, 3-ethyl benzene to a substituted aromatic compound).
4. The reviewer may elect to report all similar compounds as a total (e.g., all alkanes may be summarized and reported as total hydrocarbons).

5. Target compounds from other fractions and suspected laboratory contaminants should be marked as "non-reportable".
6. Other Case factors may influence TIC judgments. If a sample TIC match is poor, but other samples have a TIC with a valid library match, similar RRT, and the same ions, infer identification information from the other sample TIC results.
7. Note in the Data Review Narrative any changes made to the reported data or any concerns regarding TIC identifications.
8. Note, for Contract Laboratory COR action, failure to properly evaluate and report TICs

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

SAMPLE QUANTITATION AND REPORTED CONTRACT REQUIRED QUANTITATION LIMITS (CRQLS)

Action:

1. When a sample is analyzed at more than one dilution, the lower CRQL are used unless a QC exceedance dictates the use of higher CRQLs from the diluted sample. Samples reported with an "E" qualifier should be reported from the diluted sample.
2. If any discrepancies are found, the Region's designated representative may contact the laboratory to obtain additional information that could resolve any differences. If a discrepancy remains unresolved, the reviewer must use professional judgment to decide which value is the most accurate. Under these circumstances, the reviewer may determine that qualification of data is warranted. Note in the Data Review Narrative a description of the reasons for data qualification and the qualification that is applied to the data.
3. For non-aqueous samples, if the solids is less than 10.0%, use professional judgment for both detects and non-detects. If the percent solid for a soil sample is greater than or equal to 10.0% and less than 30.0%, use professional judgment to qualify detects and non-detects. If the percent solid for a soil sample is greater than or equal to 30.0%, detects and non-detects should not be qualified (see Table 11).
4. Note, for Contract Laboratory COR action, numerous or significant failures to accurately quantify the target compounds or to properly evaluate and adjust CRQLs.
5. Results between MDL and CRQL should be qualified as estimated "J".
6. Results < MDL should be reported at the CRQL and qualified "U". MDLs themselves should not be reported.

Table 11. Percent Solids Actions for Semivolatile Analysis for Non-Aqueous Samples

Criteria	Action	
	Detects	Non-detects
%Solids < 10.0%	Use professional judgment	Use professional judgment
10.0% ≤ %Solids ≤ 30.0%	Use professional judgment	Use professional judgment
%Solids > 30.0%	No qualification	No qualification

SAMPLE QUANTITATION

The sample quantitation evaluation is to verify laboratory quantitation results. In the space below, please show a minimum of one sample calculation:

Sample ID:__ JC23443-1_(Scan)__ Analyte:__1,4-dioxane__ RF:_0.584

[] = (64616)(40)/(141307)(0.584)
= 31.32 ppm Ok

QUANTITATION LIMITS

A. Dilution performed

SAMPLE ID	DILUTION FACTOR	REASON FOR DILUTION

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

FIELD DUPLICATE PRECISION

Sample IDs: _____-_____ Matrix:____-____

Field 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 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.

The project QAPP should be reviewed for project-specific information.
Suggested criteria: if large RPD (> 50 %) is observed, confirm identification of the samples and note differences. If both samples and duplicate are <5 SQL, the RPD criteria is doubled.

COMPOUND	SQL ug/L	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
No field/laboratory duplicate analyzed as part of this data package. MS/MSD % recovery RPD used to assess precision. RPD within the required criteria < 50 % for detected target analytes above 5 SQL.					

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

OTHER ISSUES

A. System Performance

List samples qualified based on the degradation of system performance during simple analysis:

Sample ID	Comments	Actions

Action:

Use professional judgment to qualify the data if it is determined that system performance has degraded during sample analyses. Inform the Contract Laboratory Program COR any action as a result of degradation of system performance which significantly affected the data.

B. Overall Assessment of Data

List samples qualified based on other issues:

Sample ID	Comments	Actions

_No_other_issues_that_required_the_need_to_qualify_the_data._Results_are_valid_and_can_be_used_for_decission_purposes._Other_discrepancies_are_shown_below._____

Note: JC23443-1 and JC23443-2: There are compounds in BS were outside in house QC limits. The results confirmed by re-extraction outside the holding time.

Action:

1. Use professional judgment to determine if there is any need to qualify data which were not qualified based on the Quality Control (QC) criteria previously discussed.
2. Write a brief narrative to give the user an indication of the analytical limitations of the data. Inform the Contract Laboratory COR the action, any inconsistency of the data with the Sample Delivery Group (SDG) Narrative. If sufficient information on the intended use and required quality of the data is available, the reviewer should include their assessment of the usability of the data within the given context. This may be used as part of a formal Data Quality Assessment (DQA).

3. Sometimes, due to dilutions, re-analysis or SIM/Scan runs are being performed, there will be multiple results for a single analyte from a single sample. The following criteria and professional judgment are used to determine which result should be reported:
    - The analysis with the lower CRQL
    - The analysis with the better QC results
    - The analysis with the higher results