DV Qualifiers in database
- HR

checked by RT
2/3/17

CETIFICATION

SDG No:	JC33175	Laboratory:	Accutest, New Jersey
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 December 6, 2016 and were analyzed in Accutest Laboratory of Dayton, New Jersey for the parameters shown in Table 1. The results were reported under SDG No.: JC33175. 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
JC33175-1	UP-1	Groundwater	1,3-butadiene; ABN TCL Special List; Selected PAHs and 1,4-dioxane (SIM); LMWA; Pesticides
JC33175-1D	UP-1 MSD	Groundwater	1,3-butadiene; ABN TCL Special List; Selected PAHs and 1,4-dioxane (SIM); LMWA; Pesticides
JC33175-1S	UP-1 MS	Groundwater	1,3-butadiene; ABN TCL Special List; Selected PAHs and 1,4-dioxane (SIM); LMWA; Pesticides

Reviewer Name: Rafael Infante
Chemist License 1888

Signature: Rafael Infante
Date: February 3, 2017

ESTADO LIBRE ASOCIADO DE PUERTO RICO
Rafael Infante Méndez
LIC. # 1888
QUÍMICO LICENCIADO
$1.00
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Report of Analysis

Client Sample ID:	UP-1		
Lab Sample ID:	JC33175-1	Date Sampled:	12/06/16
Matrix:	AQ - Ground Water	Date Received:	12/08/16
Method:	SW846 8260C	Percent Solids:	n/a
Project:	BMSMC, Building 5 Area, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4B67403.D	1	12/16/16	HT	n/a	n/a	V4B2772
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
106-99-0	1,3-Butadiene	ND	5.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%		76-120%
17060-07-0	1,2-Dichloroethane-D4	109%		73-122%
2037-26-5	Toluene-D8	100%		84-119%
460-00-4	4-Bromofluorobenzene	103%		78-117%

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IQ # 1888
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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 LabLink@939893 10:01 27-Dec-2016

Report of Analysis

Client Sample ID:	UP-1		
Lab Sample ID:	JC33175-1	Date Sampled:	12/06/16
Matrix:	AQ - Ground Water	Date Received:	12/08/16
Method:	SW846 8270D SW846 3510C	Percent Solids:	n/a
Project:	BMSMC, Building 5 Area, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	6P33028.D	1	12/15/16	CS	12/13/16	OP99167	E6P1523
Run #2 [b]	M130072.D	1	12/17/16	JJ	12/15/16	OP99254	EM5555

	Initial Volume	Final Volume
Run #1	950 ml	1.0 ml
Run #2	950 ml	1.0 ml

ABN TCL Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	5.3	0.86	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.3	0.94	ug/l	
120-83-2	2,4-Dichlorophenol	ND	2.1	1.3	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.3	2.6	ug/l	
51-28-5	2,4-Dinitrophenol	ND	11	1.6	ug/l	
534-52-1	4,6-Dinitro-o-cresol [c]	ND	5.3	1.4	ug/l	
95-48-7	2-Methylphenol	ND	2.1	0.93	ug/l	
	3&4-Methylphenol	ND	2.1	0.93	ug/l	
88-75-5	2-Nitrophenol	ND	5.3	1.0	ug/l	
100-02-7	4-Nitrophenol	ND	11	1.2	ug/l	
87-86-5	Pentachlorophenol	ND	4.2	1.5	ug/l	
108-95-2	Phenol	ND	2.1	0.41	ug/l	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	5.3	1.5	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.3	1.4	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.3	0.97	ug/l	
83-32-9	Acenaphthene	ND	1.1	0.20	ug/l	
208-96-8	Acenaphthylene	ND	1.1	0.14	ug/l	
98-86-2	Acetophenone	ND	2.1	0.22	ug/l	
120-12-7	Anthracene	1.9	1.1	0.22	ug/l	
1912-24-9	Atrazine	ND	2.1	0.47	ug/l	
100-52-7	Benzaldehyde	ND	5.3	0.30	ug/l	
56-55-3	Benzo(a)anthracene	ND	1.1	0.21	ug/l	
50-32-8	Benzo(a)pyrene	ND	1.1	0.22	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	1.1	0.22	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	1.1	0.36	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	1.1	0.22	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	2.1	0.43	ug/l	
85-68-7	Butyl benzyl phthalate	ND	2.1	0.48	ug/l	
92-52-4	1,1'-Biphenyl	ND	1.1	0.22	ug/l	
91-58-7	2-Chloronaphthalene	ND	2.1	0.25	ug/l	
106-47-8	4-Chloroaniline	ND	5.3	0.36	ug/l	
86-74-8	Carbazole	ND	1.1	0.24	ug/l	

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Rafael Infante Méndez
IQ # 1888
QUÍMICO LICENCIADO

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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

Report of Analysis

Client Sample ID:	UP-1		
Lab Sample ID:	JC33175-1	Date Sampled:	12/06/16
Matrix:	AQ - Ground Water	Date Received:	12/08/16
Method:	SW846 8270D SW846 3510C	Percent Solids:	n/a
Project:	BMSMC, Building 5 Area, PR		

ABN TCL Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	2.1	0.68	ug/l	
218-01-9	Chrysene	ND	1.1	0.19	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	2.1	0.29	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	2.1	0.26	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	2.1	0.42	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	2.1	0.39	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	1.1	0.58	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	1.1	0.50	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	2.1	0.53	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	1.1	0.35	ug/l	
132-64-9	Dibenzofuran	ND	5.3	0.23	ug/l	
84-74-2	Di-n-butyl phthalate	ND	2.1	0.52	ug/l	
117-84-0	Di-n-octyl phthalate	ND	2.1	0.25	ug/l	
84-66-2	Diethyl phthalate	ND	2.1	0.28	ug/l	
131-11-3	Dimethyl phthalate	ND	2.1	0.23	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	2.1	1.7	ug/l	
206-44-0	Fluoranthene	ND	1.1	0.18	ug/l	
86-73-7	Fluorene	ND	1.1	0.18	ug/l	
118-74-1	Hexachlorobenzene	ND	1.1	0.34	ug/l	
87-68-3	Hexachlorobutadiene	ND	1.1	0.52	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	11	2.9	ug/l	
67-72-1	Hexachloroethane	ND	2.1	0.41	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1.1	0.35	ug/l	
78-59-1	Isophorone	ND	2.1	0.29	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.1	0.22	ug/l	
88-74-4	2-Nitroaniline	ND	5.3	0.29	ug/l	
99-09-2	3-Nitroaniline	ND	5.3	0.41	ug/l	
100-01-6	4-Nitroaniline	ND	5.3	0.46	ug/l	
98-95-3	Nitrobenzene	ND	2.1	0.68	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	2.1	0.51	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.3	0.23	ug/l	
85-01-8	Phenanthrene	ND	1.1	0.18	ug/l	
129-00-0	Pyrene	ND	1.1	0.23	ug/l	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	2.1	0.39	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	47%	63%	14-88%
4165-62-2	Phenol-d5	34%	45%	10-110%
118-79-6	2,4,6-Tribromophenol	89%	119%	39-149%

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Report of Analysis

Client Sample ID:	UP-1		
Lab Sample ID:	JC33175-1	**Date Sampled:**	12/06/16
Matrix:	AQ - Ground Water	**Date Received:**	12/08/16
Method:	SW846 8270D SW846 3510C	**Percent Solids:**	n/a
Project:	BMSMC, Building 5 Area, PR		

ABN TCL Special List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	89%	99%	32-128%
321-60-8	2-Fluorobiphenyl	75%	98%	35-119%
1718-51-0	Terphenyl-d14	54%	96%	10-126%

(a) There is compound in BS was outside in house QC limits. The results confirmed by reextraction outside the holding time.
(b) Confirmation run.
(c) This compound outside control limits biased low in the associated BS. The result confirmed by reextraction outside the holding time.

ND = Not detected MDL = Method Detection Limit
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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

Raw Data: 3P57227.D

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Report of Analysis

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Client Sample ID:	UP-1		
Lab Sample ID:	JC33175-1	Date Sampled:	12/06/16
Matrix:	AQ - Ground Water	Date Received:	12/08/16
Method:	SW846 8270D BY SIM SW846 3510C	Percent Solids:	n/a
Project:	BMSMC, Building 5 Area, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3P57227.D	1	12/14/16	SG	12/13/16	OP99167A	E3P2653
Run #2							

	Initial Volume	Final Volume
Run #1	950 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
56-55-3	Benzo(a)anthracene	ND	0.053	0.024	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.053	0.035	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.11	0.046	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.11	0.035	ug/l	
218-01-9	Chrysene	ND	0.11	0.027	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.11	0.038	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.11	0.040	ug/l	
91-20-3	Naphthalene	ND	0.11	0.031	ug/l	
123-91-1	1,4-Dioxane	0.910	0.11	0.051	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	67%		24-125%
321-60-8	2-Fluorobiphenyl	70%		19-127%
1718-51-0	Terphenyl-d14	57%		10-119%

ABOGADO DE PUERTO RICO
Manuel Infante Méndez
1888
QUIMICO LICENCIADO

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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:	UP-1		
Lab Sample ID:	JC33175-1	Date Sampled:	12/06/16
Matrix:	AQ - Ground Water	Date Received:	12/08/16
Method:	SW846-8015C (DAI)	Percent Solids:	n/a
Project:	BMSMC, Building 5 Area, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH107771.D	1	12/15/16	XPL	n/a	n/a	GGH5589
Run #2							

Low Molecular Alcohol List

CAS No.	Compound	Result	RL	MDL	Units	Q
64-17-5	Ethanol	ND	200	55	ug/l	
78-83-1	Isobutyl Alcohol	ND	100	36	ug/l	
67-63-0	Isopropyl Alcohol	ND	100	68	ug/l	
71-23-8	n-Propyl Alcohol	ND	100	43	ug/l	
71-36-3	n-Butyl Alcohol	ND	100	87	ug/l	
78-92-2	sec-Butyl Alcohol	ND	100	66	ug/l	
67-56-1	Methanol	ND	200	71	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	85%		56-145%
111-27-3	Hexanol	84%		56-145%

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N = Indicates presumptive evidence of a compound

SGS Accutest LabLink@939893 10:01 27-Dec-2016

Report of Analysis

Client Sample ID:	UP-1		
Lab Sample ID:	JC33175-1	Date Sampled:	12/06/16
Matrix:	AQ - Ground Water	Date Received:	12/08/16
Method:	SW846 8081B SW846 3510C	Percent Solids:	n/a
Project:	BMSMC, Building 5 Area, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	1G130502.D	1	12/14/16	KD	12/13/16	OP99172	G1G4171
Run #2							

	Initial Volume	Final Volume
Run #1	950 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.011	0.0064	ug/l	
319-84-6	alpha-BHC	ND	0.011	0.0063	ug/l	
319-85-7	beta-BHC	ND	0.011	0.0060	ug/l	
319-86-8	delta-BHC	ND	0.011	0.0048	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.011	0.0029	ug/l	
5103-71-9	alpha-Chlordane	ND	0.011	0.0049	ug/l	
5103-74-2	gamma-Chlordane	ND	0.011	0.0048	ug/l	
60-57-1	Dieldrin	ND	0.011	0.0038	ug/l	
72-54-8	4,4'-DDD	ND	0.011	0.0040	ug/l	
72-55-9	4,4'-DDE	ND	0.011	0.0065	ug/l	
50-29-3	4,4'-DDT	ND	0.011	0.0052	ug/l	
72-20-8	Endrin	ND	0.011	0.0053	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.011	0.0055	ug/l	
7421-93-4	Endrin aldehyde	ND	0.011	0.0054	ug/l	
53494-70-5	Endrin ketone	ND	0.011	0.0053	ug/l	
959-98-8	Endosulfan-I	ND	0.011	0.0052	ug/l	
33213-65-9	Endosulfan-II	ND	0.011	0.0045	ug/l	
76-44-8	Heptachlor	ND	0.011	0.0040	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.011	0.0069	ug/l	
72-43-5	Methoxychlor	ND	0.021	0.0060	ug/l	
8001-35-2	Toxaphene	ND	0.26	0.19	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	98%		26-132%
877-09-8	Tetrachloro-m-xylene	94%		26-132%
2051-24-3	Decachlorobiphenyl	66%		10-118%
2051-24-3	Decachlorobiphenyl	65%		10-118%

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Méndez
K # 1888
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J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: JC33175
Account: AMANYWP Anderson, Mulholland & Associates
Project: BMSMC, Building 5 Area, PR

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC33175-1MS	4B67404.D	1	12/16/16	HT	n/a	n/a	V4B2772
JC33175-1MSD	4B67405.D	1	12/16/16	HT	n/a	n/a	V4B2772
JC33175-1	4B67403.D	1	12/16/16	HT	n/a	n/a	V4B2772

The QC reported here applies to the following samples: Method: SW846 8260C

JC33175-1

CAS No.	Compound	JC33175-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
106-99-0	1,3-Butadiene	ND		50	55.4	111	50	52.6	105	5	10-167/20

CAS No.	Surrogate Recoveries	MS	MSD	JC33175-1	Limits
1868-53-7	Dibromofluoromethane	105%	107%	102%	76-120%
17060-07-0	1,2-Dichloroethane-D4	105%	105%	109%	73-122%
2037-26-5	Toluene-D8	101%	100%	100%	84-119%
460-00-4	4-Bromofluorobenzene	102%	101%	103%	78-117%

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Méndez
IC # 1888
...UMICO LICENCIADO

* = Outside of Control Limits.

Raw Data: 6P33023.D 6P33024.D

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: JC33175
Account: AMANYWP Anderson, Mulholland & Associates
Project: BMSMC, Building 5 Area, PR

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP99167-MS	6P33023.D	1	12/15/16	CS	12/13/16	OP99167	E6P1523
OP99167-MSD	6P33024.D	1	12/15/16	CS	12/13/16	OP99167	E6P1523
JC33175-1 [a]	6P33028.D	1	12/15/16	CS	12/13/16	OP99167	E6P1523

The QC reported here applies to the following samples: Method: SW846 8270D

JC33175-1

CAS No.	Compound	JC33175-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
95-57-8	2-Chlorophenol	ND		103	65.3	63	103	63.1	61	3	49-110/20
59-50-7	4-Chloro-3-methyl phenol	ND		103	91.7	89	103	85.1	83	7	44-121/18
120-83-2	2,4-Dichlorophenol	ND		103	79.1	77	103	74.5	72	6	42-120/19
105-67-9	2,4-Dimethylphenol	ND		103	96.5	94	103	91.7	89	5	33-132/23
51-28-5	2,4-Dinitrophenol	ND		206	196	95	206	183	89	7	21-145/26
534-52-1	4,6-Dinitro-o-cresol	ND		103	95.9	93	103	89.6	87	7	25-134/27
95-48-7	2-Methylphenol	ND		103	73.1	71	103	70.4	68	4	47-112/18
	3&4-Methylphenol	ND		103	71.3	69	103	69.3	67	3	44-113/19
88-75-5	2-Nitrophenol	ND		103	75.2	73	103	72.4	70	4	45-118/20
100-02-7	4-Nitrophenol	ND		103	83.8	81	103	82.6	80	1	23-144/28
87-86-5	Pentachlorophenol	ND		103	97.5	95	103	87.3	85	11	25-151/25
108-95-2	Phenol	ND		103	42.1	41	103	39.9	39	5	22-100/22
58-90-2	2,3,4,6-Tetrachlorophenol	ND		103	84.7	82	103	80.5	78	5	44-122/21
95-95-4	2,4,5-Trichlorophenol	ND		103	84.3	82	103	81.7	79	3	51-124/20
88-06-2	2,4,6-Trichlorophenol	ND		103	91.5	89	103	86.2	84	6	53-120/21
83-32-9	Acenaphthene	ND		103	85.6	83	103	78.5	76	9	52-120/23
208-96-8	Acenaphthylene	ND		103	82.8	80	103	76.7	74	8	50-101/22
98-86-2	Acetophenone	ND		103	86.2	84	103	81.5	79	6	31-141/23
120-12-7	Anthracene	1.9		103	83.6	79	103	79.0	75	6	54-117/22
1912-24-9	Atrazine	ND		103	85.7	83	103	82.3	80	4	42-152/23
100-52-7	Benzaldehyde	ND		103	68.0	66	103	66.3	64	3	10-164/30
56-55-3	Benzo(a)anthracene	ND		103	86.4	84	103	81.4	79	6	40-123/24
50-32-8	Benzo(a)pyrene	ND		103	84.7	82	103	79.9	78	6	41-127/25
205-99-2	Benzo(b)fluoranthene	ND		103	89.7	87	103	86.8	84	3	39-127/27
191-24-2	Benzo(g,h,i)perylene	ND		103	87.4	85	103	83.2	81	5	34-128/28
207-08-9	Benzo(k)fluoranthene	ND		103	86.4	84	103	82.3	80	5	39-122/26
101-55-3	4-Bromophenyl phenyl ether	ND		103	94.9	92	103	87.7	85	8	51-124/23
85-68-7	Butyl benzyl phthalate	ND		103	85.4	83	103	80.9	78	5	21-146/28
92-52-4	1,1'-Biphenyl	ND		103	85.5	83	103	80.7	78	6	27-142/23
91-58-7	2-Chloronaphthalene	ND		103	84.7	82	103	80.2	78	5	51-109/23
106-47-8	4-Chloroaniline	ND		103	52.7	51	103	39.4	38	29	10-110/55
86-74-8	Carbazole	ND		103	82.1	80	103	75.1	73	9	52-116/22
105-60-2	Caprolactam	ND		103	26.9	26	103	24.8	24	8	10-106/34
218-01-9	Chrysene	ND		103	80.6	78	103	76.6	74	5	41-128/24
111-91-1	bis(2-Chloroethoxy)methane	ND		103	97.4	94	103	[illegible]	90	5	46-120/24
111-44-4	bis(2-Chloroethyl)ether	ND		103	92.3	90	103	[illegible]	[illegible]	4	42-123/28

* = Outside of Control Limits.

8.3.1

8

JOSÉ A. ADORNO DE PUERTO RICO
Manuel Infante Méndez
IQ # 1888
QUÍMICO LICENCIADO

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: JC33175
Account: AMANYWP Anderson, Mulholland & Associates
Project: BMSMC, Building 5 Area, PR

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP99167-MS	6P33023.D	1	12/15/16	CS	12/13/16	OP99167	E6P1523
OP99167-MSD	6P33024.D	1	12/15/16	CS	12/13/16	OP99167	E6P1523
JC33175-1 [a]	6P33028.D	1	12/15/16	CS	12/13/16	OP99167	E6P1523

The QC reported here applies to the following samples: Method: SW846 8270D

JC33175-1

CAS No.	Compound	JC33175-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
108-60-1	bis(2-Chloroisopropyl)ether	ND		103	83.0	81	103	77.8	75	6	41-117/25
7005-72-3	4-Chlorophenyl phenyl ether	ND		103	99.1	96	103	93.5	91	6	48-121/21
121-14-2	2,4-Dinitrotoluene	ND		103	94.8	92	103	90.0	87	5	54-123/27
606-20-2	2,6-Dinitrotoluene	ND		103	89.5	87	103	84.5	82	6	55-125/26
91-94-1	3,3'-Dichlorobenzidine	ND		206	137	66	206	110	53	22	10-107/47
53-70-3	Dibenzo(a,h)anthracene	ND		103	91.0	88	103	86.0	83	6	35-130/27
132-64-9	Dibenzofuran	ND		103	87.8	85	103	81.4	79	8	53-112/22
84-74-2	Di-n-butyl phthalate	ND		103	88.1	85	103	82.2	80	7	38-129/23
117-84-0	Di-n-octyl phthalate	ND		103	88.8	86	103	85.2	83	4	35-145/26
84-66-2	Diethyl phthalate	ND		103	93.8	91	103	86.3	84	8	16-136/30
131-11-3	Dimethyl phthalate	ND		103	86.7	84	103	81.4	79	6	10-143/39
117-81-7	bis(2-Ethylhexyl)phthalate	ND		103	84.2	82	103	79.0	77	6	34-141/28
206-44-0	Fluoranthene	ND		103	87.7	85	103	82.3	80	6	47-123/24
86-73-7	Fluorene	ND		103	87.6	85	103	82.9	80	6	56-117/22
118-74-1	Hexachlorobenzene	ND		103	91.1	88	103	87.4	85	4	46-125/24
87-68-3	Hexachlorobutadiene	ND		103	79.1	77	103	76.3	74	4	26-121/24
77-47-4	Hexachlorocyclopentadiene	ND		206	169	82	206	158	77	7	10-133/31
67-72-1	Hexachloroethane	ND		103	66.1	64	103	64.6	63	2	35-111/26
193-39-5	Indeno(1,2,3-cd)pyrene	ND		103	88.0	85	103	84.3	82	4	32-130/30
78-59-1	Isophorone	ND		103	92.3	90	103	87.2	85	6	47-126/23
91-57-6	2-Methylnaphthalene	ND		103	77.6	75	103	71.4	69	8	34-123/24
88-74-4	2-Nitroaniline	ND		103	114	111	103	105	102	8	46-137/23
99-09-2	3-Nitroaniline	ND		103	59.7	58	103	52.0	50	14	10-110/50
100-01-6	4-Nitroaniline	ND		103	74.5	72	103	68.8	67	8	38-118/25
98-95-3	Nitrobenzene	ND		103	94.6	92	103	91.1	88	4	35-130/25
621-64-7	N-Nitroso-di-n-propylamine	ND		103	94.1	91	103	88.8	86	6	45-123/22
86-30-6	N-Nitrosodiphenylamine	ND		103	79.8	77	103	75.0	73	6	46-123/24
85-01-8	Phenanthrene	ND		103	81.0	79	103	76.4	74	6	48-121/23
129-00-0	Pyrene	ND		103	85.4	83	103	79.1	77	8	43-124/26
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		103	96.5	94	103	90.1	87	7	25-142/24

CAS No.	Surrogate Recoveries	MS	MSD	JC33175-1	Limits
367-12-4	2-Fluorophenol	55%	56%	47%	14-88%
4165-62-2	Phenol-d5	39%	39%	34%	10-110%

* = Outside of Control Limits.

8.3.1

8

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: JC33175
Account: AMANYWP Anderson, Mulholland & Associates
Project: BMSMC, Building 5 Area, PR

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP99167-MS	6P33023.D	1	12/15/16	CS	12/13/16	OP99167	E6P1523
OP99167-MSD	6P33024.D	1	12/15/16	CS	12/13/16	OP99167	E6P1523
JC33175-1 [a]	6P33028.D	1	12/15/16	CS	12/13/16	OP99167	E6P1523

The QC reported here applies to the following samples: Method: SW846 8270D

JC33175-1

CAS No.	Surrogate Recoveries	MS	MSD	JC33175-1	Limits
118-79-6	2,4,6-Tribromophenol	94%	86%	89%	39-149%
4165-60-0	Nitrobenzene-d5	95%	90%	89%	32-128%
321-60-8	2-Fluorobiphenyl	81%	76%	75%	35-119%
1718-51-0	Terphenyl-d14	79%	77%	54%	10-126%

(a) There is compound in BS was outside in house QC limits. The results confirmed by reextraction outside the holding time.

8.3.1

8

* = Outside of Control Limits.

Raw Data: 3P57219.D 3P57220.D

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: JC33175
Account: AMANYWP Anderson, Mulholland & Associates
Project: BMSMC, Building 5 Area, PR

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP99167A-MS	3P57219.D	1	12/14/16	SG	12/13/16	OP99167A	E3P2653
OP99167A-MSD	3P57220.D	1	12/14/16	SG	12/13/16	OP99167A	E3P2653
JC33175-1	3P57227.D	1	12/14/16	SG	12/13/16	OP99167A	E3P2653

The QC reported here applies to the following samples: Method: SW846 8270D BY SIM

JC33175-1

CAS No.	Compound	JC33175-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
56-55-3	Benzo(a)anthracene	ND		2.11	2.39	114	2.11	2.34	111	2	25-135/33
50-32-8	Benzo(a)pyrene	ND		2.11	1.72	82	2.11	1.54	73	11	10-116/38
205-99-2	Benzo(b)fluoranthene	ND		2.11	2.10	100	2.11	1.87	89	12	10-131/40
207-08-9	Benzo(k)fluoranthene	ND		2.11	2.04	97	2.11	1.79	85	13	10-120/45
218-01-9	Chrysene	ND		2.11	1.83	87	2.11	1.89	90	3	31-125/33
53-70-3	Dibenzo(a,h)anthracene	ND		2.11	1.86	88	2.11	1.62	77	14	10-116/48
193-39-5	Indeno(1,2,3-cd)pyrene	ND		2.11	2.04	97	2.11	1.76	84	15	10-116/48
91-20-3	Naphthalene	ND		2.11	1.58	75	2.11	1.57	75	1	23-140/36
123-91-1	1,4-Dioxane	0.910		2.11	1.89	47	2.11	2.40	71	24	20-160/30

CAS No.	Surrogate Recoveries	MS	MSD	JC33175-1	Limits
367-12-4	2-Fluorophenol	46%	59%		14-81%
4165-62-2	Phenol-d5	32%	48%		11-54%
118-79-6	2,4,6-Tribromophenol	107%	106%		35-145%
4165-60-0	Nitrobenzene-d5	73%	70%	67%	24-125%
321-60-8	2-Fluorobiphenyl	71%	70%	70%	19-127%
1718-51-0	Terphenyl-d14	90%	91%	57%	10-119%

* = Outside of Control Limits.

8.3.2

8

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: JC33175
Account: AMANYWP Anderson, Mulholland & Associates
Project: BMSMC, Building 5 Area, PR

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC33175-1MS	GH107772.D	1	12/15/16	XPL	n/a	n/a	GGH5589
JC33175-1MSD	GH107773.D	1	12/15/16	XPL	n/a	n/a	GGH5589
JC33175-1	GH107771.D	1	12/15/16	XPL	n/a	n/a	GGH5589

The QC reported here applies to the following samples: Method: SW846-8015C (DAI)

JC33175-1

CAS No.	Compound	JC33175-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
64-17-5	Ethanol	ND		5000	3820	76	5000	4470	89	16	58-145/27
78-83-1	Isobutyl Alcohol	ND		5000	4380	88	5000	5470	109	22	69-131/25
67-63-0	Isopropyl Alcohol	ND		5000	3590	72	5000	3950	79	10	70-133/28
71-23-8	n-Propyl Alcohol	ND		5000	4050	81	5000	5540	111	31* a	66-137/29
71-36-3	n-Butyl Alcohol	ND		5000	6450	129	5000	6000	120	7	63-131/25
78-92-2	sec-Butyl Alcohol	ND		5000	5200	104	5000	5080	102	2	64-136/25
67-56-1	Methanol	ND		5000	3990	80	5000	3810	76	5	48-148/34

CAS No.	Surrogate Recoveries	MS	MSD	JC33175-1	Limits
111-27-3	Hexanol	91%	91%	85%	56-145%
111-27-3	Hexanol	81%	92%	84%	56-145%

(a) Outside in house control limits.

10.3.1

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* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: JC33175
Account: AMANYWP Anderson, Mulholland & Associates
Project: BMSMC, Building 5 Area, PR

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP99172-MS	1G130503.D	1	12/14/16	KD	12/13/16	OP99172	G1G4171
OP99172-MSD	1G130504.D	1	12/14/16	KD	12/13/16	OP99172	G1G4171
JC33175-1	1G130502.D	1	12/14/16	KD	12/13/16	OP99172	G1G4171

The QC reported here applies to the following samples: Method: SW846 8081B

JC33175-1

CAS No.	Compound	JC33175-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
309-00-2	Aldrin	ND		0.525	0.50	95	0.525	0.44	84	13	37-159/40
319-84-6	alpha-BHC	ND		0.525	0.55	105	0.525	0.51	97	8	37-164/37
319-85-7	beta-BHC	ND		0.525	0.64	122	0.525	0.57	108	12	46-151/36
319-86-8	delta-BHC	ND		0.525	0.65	124	0.525	0.58	110	11	32-168/36
58-89-9	gamma-BHC (Lindane)	ND		0.525	0.58	110	0.525	0.52	99	11	44-160/37
5103-71-9	alpha-Chlordane	ND		0.525	0.57	108	0.525	0.50	95	13	38-160/35
5103-74-2	gamma-Chlordane	ND		0.525	0.57	108	0.525	0.50	95	13	39-157/37
60-57-1	Dieldrin	ND		0.525	0.54	103	0.525	0.49	93	10	42-161/36
72-54-8	4,4'-DDD	ND		0.525	0.52	99	0.525	0.47	89	10	40-161/36
72-55-9	4,4'-DDE	ND		0.525	0.55	105	0.525	0.49	93	12	34-158/36
50-29-3	4,4'-DDT	ND		0.525	0.56	106	0.525	0.46	87	20	41-173/33
72-20-8	Endrin	ND		0.525	0.59	112	0.525	0.52	99	13	44-166/35
1031-07-8	Endosulfan sulfate	ND		0.525	0.56	106	0.525	0.50	95	11	46-161/36
7421-93-4	Endrin aldehyde	ND		0.525	0.56	106	0.525	0.54	103	4	34-149/36
53494-70-5	Endrin ketone	ND		0.525	0.57	108	0.525	0.51	97	11	44-157/36
959-98-8	Endosulfan-I	ND		0.525	0.56	106	0.525	0.50	95	11	43-154/35
33213-65-9	Endosulfan-II	ND		0.525	0.54	103	0.525	0.49	93	10	40-162/35
76-44-8	Heptachlor	ND		0.525	0.58	110	0.525	0.50	95	15	33-153/37
1024-57-3	Heptachlor epoxide	ND		0.525	0.56	106	0.525	0.52	99	7	45-154/37
72-43-5	Methoxychlor	ND		0.525	0.49	93	0.525	0.44	84	11	48-169/32
8001-35-2	Toxaphene	ND			ND			ND		nc	50-150/30

CAS No.	Surrogate Recoveries	MS	MSD	JC33175-1	Limits
877-09-8	Tetrachloro-m-xylene	87%	79%	98%	26-132%
877-09-8	Tetrachloro-m-xylene	88%	77%	94%	26-132%
2051-24-3	Decachlorobiphenyl	52%	46%	66%	10-118%
2051-24-3	Decachlorobiphenyl	54%	48%	65%	10-118%

QUIMICO LICENCIADO ... Manuel Infante Méndez

* = Outside of Control Limits.

12.3.1 12

NJ GW

CHAIN OF CUSTODY

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

PAGE 1 OF 1

MASTER #
FED EX Tracking # 7778 7935 4966
Bottle Order Control #
SGS Accutest Quote #
SGS Accutest Job # JC33175

Client / Reporting Information

Company Name: Anderson Mulholland & Associates
Street Address: 2700 Westchester Avenue, Suite 417
City / State / Zip: Purchase NY 10577
Project Contact / E-mail: Terry Taylor
Phone # / Fax #: 914-251-0400
Sampler(s) Name(s) / Phone #:

Project Information

Project Name: 4th Q 2016 Groundwater Sampling - Onsite Wells
Street:
City / State: Humacao PR
Project #:
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

Sample #	Field ID / Point of Collection	MEOH# Vial #	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	DI Water	MEOH	ENCORE	DB015LMA	PB081PESTTCL	AB8270SL	B8270SIM14DIOX	BMS+MNAP	BMS+2MNAP	BSIM+BANTH, BAP, BBF, BKF, CHRY, DBANTH, INDPYR, NAP (SEE NOTE BELOW)	WET CHEMISTRY (SEE NOTE BELOW)				LAB USE ONLY
	UP-1		12-6-16	1212	NR	GW	6	3				3				X	X	X	X	X	X	X					
1	UP-1 MS		12-6-16	1230	NR	GW	6	3				3				X	X	X	X	X	X	X					E4
	UP-1 MSD		12-6-16	1248	NR	GW	6	3				3				X	X	X	X	X	X	X					V734

Turnaround Time (Business days)
- [X] Std. 10 Business Days
- [ ] 6 Day RUSH
- [ ] 3 Day RUSH
- [ ] 2 Day RUSH
- [ ] 1 Day RUSH
- [ ] other

Approved By (SGS Accutest PM): / Date:
INITIAL ASESSMENT 13
LABEL VERIFICATION JK

Emergency & Rush T/A data available VIA Labtrack

Data Deliverable Information
- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [X] FULL!! (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

WET CHEMISTRY INCLUDES ALK, XFE3, MN, VRSK175CH4, XNO30, SO4, AND S

BANTH=BENZO(A)ANTHRACENE, BAP=BENZO(A)PYRENE, BBF=BENZO(B)FLUORANTHENE, BKF=BENZO(K)FLUROANTHENE, CHRY=CHRYSENE, DBANTH=DIBENZO(A,H)ANTHRACENE, INDPYR=INDENO(1,2,3-CD)PYRENE, NAP=NAPHTHALENE

Sample inventory is verified upon receipt in the Laboratory

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]	12-6-16 1500	1 Fed Ex	2 Fedex	12/8/16 1100	2 [signature]
3 Relinquished by Sampler:	Date Time:	3 Received By:	4 Relinquished By:	Date Time:	4 Received By:
5 Relinquished by:	Date Time:	5 Received By:	Custody Seal # 636 637, 638, 639, 640	Preserved where applicable	On Ice: Cooler Temp. 2.2

5.2 5

JC33175: Chain of Custody
Page 1 of 2

EXECUTIVE NARRATIVE

SDG No:	**JC33175**	Laboratory:	**Accutest, New Jersey**
Analysis:	**SW846-8260C**	Number of Samples:	**3**
Location:	BMSMC, Building 5 Area Humacao, PR		

SUMMARY: Three (3) samples were analyzed for selected VOAs of the TCL list (1,3-butadiene) by method SW846-8260C. Samples were validated following USEPA Hazardous Waste Support Section SOP No. HW-33A Revision 0 SOM02.2. Low/Medium Volatile Data Validation. July, 2015.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: Rafael Infante

Date: January 11, 2017

SAMPLE ORGANIC DATA SAMPLE SUMMARY

Sample ID: JC33175-1
Sample location: BMSMC Building 5 Area
Sampling date: 6-Dec-16
Matrix: Groundwater

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
1,3-butadiene	5.0	ug/l	1	-	U	Yes

Sample ID: JC33175-1MS
Sample location: BMSMC Building 5 Area
Sampling date: 6-Dec-16
Matrix: Groundwater

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
1,3-butadiene	55.4	ug/l	1	-	-	Yes

Sample ID: JC33175-1MSD
Sample location: BMSMC Building 5 Area
Sampling date: 12-Sep-16
Matrix: Groundwater

METHOD: 8260C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
1,3-butadiene	52.6	ug/l	1	-	-	Yes

DATA REVIEW WORKSHEETS

Project Number:_JC33175_____
Date:_____December_06,_2016_____
Shipping date:___December_06,_2016___
EPA Region:_____2_____

REVIEW OF VOLATILE ORGANIC PACKAGE
Low/Medium Volatile Data Validation

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: USEPA **Hazardous Waste Support Section SOP No. HW-33A Revision 0 SOM02.2. Low/Medium Volatile Data Validation**. July, 2015. 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 VOCs included:

Lab. Project/SDG No.: ____JC33175_____ Sample matrix: ___Groundwater_____
No. of Samples: _____3_____
Trip blank No.: _____-_____
Field blank No.: _____FB120616_____
Equipment blank No.:_____EB120616_____
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

_OverallComments:___Selected_VOA_(1,3-Butadiene)_from_the_TCL_list_(SW846_8260C)_____
_Field_and_Equipment_blanks_validated_in_another_project._____

Definition of Qualifiers:

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

Reviewer:_Rafael Infante_____
Date:___January_11,_2017_____

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 ANALYZED	pH	ACTION
All samples analyzed within method recommended holding time. Samples properly preserved.				

Criteria

Aqueous samples – 14 days from sample collection for preserved samples (pH $\leq$ 2, 4$\pm$ 2°C), no air bubbles.
Aqueous samples – 7 days from sample collection for unpreserved samples, 4°C, no air bubbles.
Soil samples- 14 days from sample collection.
Cooler temperature (Criteria: 4 $\pm$ 2 °C): 5.9° C - OK

Actions

Aqueous samples

a. If there is no evidence that the samples were properly preserved (pH < 2, T = 4°C ± 2°C), but the samples were analyzed within the technical holding time [7 days from sample collection], no qualification of the data is necessary.
b. If there is no evidence that the samples were properly preserved, and the samples were analyzed outside of the technical holding time [7 days from sample collection], qualify detects for all volatile compounds as estimated (J) and non-detects as unusable (R).
c. If the samples were properly preserved, and the samples were analyzed within the technical holding time [14 days from sample collection], no qualification of the data is necessary.
d. If the samples were properly preserved, but were analyzed outside of the technical holding time [14 days from sample collection], qualify detects as estimated (J) and non-detects as unusable (R).
e. If air bubbles were present in the sample vial used for analysis, qualify detected compounds as estimated (J-) and non-detected compounds as estimated (UJ).

Non-aqueous samples

a. If there is no evidence that the samples were properly preserved (T < -7°C or T = 4°C ± 2°C and preserved with $NaHSO_4$), but the samples were analyzed within the technical holding time [14 days

from sample collection], qualify detects for all volatile compounds as estimated (J) and non-detects as (UJ) or unusable (R) using professional judgment.

b. If the samples were properly preserved, and the samples were analyzed within the technical holding time [14 days from sample collection], no qualification of the data is necessary.

c. If there is no evidence that the samples were properly preserved, and the samples were analyzed outside of the technical holding time [14 days from sample collection], qualify detects for all volatile compounds as estimated (J) and non-detects as unusable (R).

d. If the samples were properly preserved, but were analyzed outside of the technical holding time [14 days from sample collection], qualify detects as estimated (J) and non-detects as unusable (R).

Qualify TCLP/SPLP samples

a. If the TCLP/SPLP ZHE procedure is performed within the extraction technical holding time of 14 days, detects and non-detects should not be qualified.

b. If the TCLP/SPLP ZHE procedure is performed outside the extraction technical holding time of 14 days, qualify detects as estimated (J) and non-detects as unusable (R).

c. If TCLP/SPLP aqueous samples and TCLP/SPLP leachate samples are analyzed within the technical holding time of 7 days, detects and non-detects should not be qualified.

d. If TCLP/SPLP aqueous samples and TCLP/SPLP leachate samples are analyzed outside of the technical holding time of 7 days, qualify detects as estimated (J) and non-detects as unusable (R).

Table 1. Holding Time Actions for Low/Medium Volatile Analyses - Summary

Matrix	Preserved	Criteria	Action	
			Detected Associated Compounds	Non-Detected Associated Compounds
Aqueous	No	≤ 7 days	No qualification	
	No	> 7 days	J	R
	Yes	≤ 14 days	No qualification	
	Yes	> 14 days	J	R
Non-Aqueous	No	≤ 14 days	J	Professional judgment, UJ or R
	Yes	≤ 14 days	No qualification	
	Yes/No	> 14 days	J	R
TCLP/SPLP	Yes	≤ 14 days	No qualification	
TCLP/SPLP	No	> 14 days	J	R

TCLP/SPLP	ZHE performed within the 14-day technical holding time	No qualification	
TCLP/SPLP	ZHE performed outside the 14-day technical holding time	J	R
TCLP/SPLP aqueous & TCLP/SPLP leachate	Analyzed within 7 days	No qualification	
TCLP/SPLP aqueous & TCLP/SPLP leachate	Analyzed outside 7 days	J	R
Sample temperature outside 4°C ± 2°C upon receipt at the laboratory		Use professional judgment	
Holding times grossly exceeded		J	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 BFB performance results were reviewed and found to be within the specified criteria.

__X___ BFB tuning was performed for every 12 hours of sample analysis.

NOTES: All mass spectrometer instrument conditions must be identical to those used during the sample analysis. Background subtraction actions resulting in spectral distortions for the sole purpose of meeting the method specifications are contrary to the Quality Assurance (QA) objectives, and are therefore unacceptable.

NOTES: No data should be qualified based on BFB failure. Instances of this should be noted in the narrative.

All ion abundance ratios must be normalized to m/z 95, the nominal base peak, even though the ion abundance of m/z 174 may be up to 120% that of m/z 95.

Actions:

If samples are analyzed without a preceding valid instrument performance check, qualify all data in those samples as unusable (R).

If ion abundance criteria are not met, professional judgment may be applied to determine to what extent the data may be utilized. When applying professional judgment to this topic, the most important factors to consider are the empirical results that are relatively insensitive to location on the chromatographic profile and the type of instrumentation. Therefore, the critical ion abundance criteria for BFB are the m/z 95/96, 174/175, 174/176, and 176/177 ratios. The relative abundances of m/z 50 and 75 are of lower importance. This issue is more critical for Tentatively Identified Compounds (TICs) than for target analytes.

Note: State in the Data Review Narrative, decisions to use analytical data associated with BFB instrument performance checks not meeting contract requirements.

Note: Verify that that instrument instrument performance check criteria were achieved using techniques described in Low/Medium Volatiles Organic Analysis, Section II.D.5 of the SOM02.2 NFG, obtain additional information on the instrument performance checks. Make sure that background subtraction was performed from the BFB peak and not from background subtracting from the solvent front or from another region of the chromatogram.

Use professional judgment to determine whether associated data should be qualified based on the spectrum of the mass calibration compound.

List the samples affected:

_____

_____

_____

_____

_____

_____

_____

If mass calibration is in error, all associated data are rejected.

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

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:_____12/08/16_____
Dates of continuing (initial) calibration:__12/08/16_____
Dates of continuing calibration:_____12/16/16_____
Dates of ending calibration:_____-_____
Instrument ID numbers:_____GCMS4B_____
Matrix/Level:_____Aqueous/low_____

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

Note: Initial calibration, initial calibration verification, and continuing calibration verification within the method and validation guidance document required performance criteria. Closing calibration check verification not included in data package. No action taken, professional judgment.

Criteria

The analyte calibration criteria in the following Table must be obtained. Analytes not meeting the criteria are qualified.

A separate worksheet should be filled for each initial curve

Initial Calibration - **Table 2. RRF, %RSD, and %D Acceptance Criteria for Initial Calibration and CCV for Low/Medium Volatile Analysis**

Analyte	Minimum RRF	Maximum %RSD	Opening Maximum %D[1]	Closing Maximum %D
Dichlorodifluoromethane	0.010	25.0	±40.0	±50.0
Chloromethane	0.010	20.0	±30.0	±50.0
Vinyl chloride	0.010	20.0	±25.0	±50.0
Bromomethane	0.010	40.0	±30.0	±50.0
Chloroethane	0.010	40.0	±25.0	±50.0
Trichlorofluoromethane	0.010	40.0	±30.0	±50.0
1,1-Dichloroethene	0.060	20.0	±20.0	±25.0
1,1,2-Trichloro-1,2,2-trifluoroethane	0.050	25.0	±25.0	±50.0
Acetone	0.010	40.0	±40.0	±50.0
Carbon disulfide	0.100	20.0	±25.0	±25.0
Methyl acetate	0.010	40.0	±40.0	±50.0
Methylene chloride	0.010	40.0	±30.0	±50.0
trans-1,2-Dichloroethene	0.100	20.0	±20.0	±25.0
Methyl tert-butyl ether	0.100	40.0	±25.0	±50.0
1,1-Dichloroethane	0.300	20.0	±20.0	±25.0
cis-1,2-Dichloroethene	0.200	20.0	±20.0	±25.0
2-Butanone	0.010	40.0	±40.0	±50.0
Bromochloromethane	0.100	20.0	±20.0	±25.0
Chloroform	0.300	20.0	±20.0	±25.0
1,1,1-Trichloroethane	0.050	20.0	±25.0	±25.0
Cyclohexane	0.010	40.0	±25.0	±50.0
Carbon tetrachloride	0.100	20.0	±25.0	±25.0
Benzene	0.200	20.0	±20.0	±25.0
1,2-Dichloroethane	0.070	20.0	±20.0	±25.0
Trichloroethene	0.200	20.0	±20.0	±25.0
Methylcyclohexane	0.050	40.0	±25.0	±50.0
1,2-Dichloropropane	0.200	20.0	±20.0	±25.0
Bromodichloromethane	0.300	20.0	±20.0	±25.0
cis-1,3-Dichloropropene	0.300	20.0	±20.0	±25.0
4-Methyl-2-pentanone	0.030	25.0	±30.0	±50.0
Toluene	0.300	20.0	±20.0	±25.0
trans-1,3-Dichloropropene	0.200	20.0	±20.0	±25.0
1,1,2-Trichloroethane	0.200	20.0	±20.0	±25.0
Tetrachloroethene	0.100	20.0	±20.0	±25.0
2-Hexanone	0.010	40.0	±40.0	±50.0
Dibromochloromethane	0.200	20.0	±20.0	±25.0
1,2-Dibromoethane	0.200	20.0	±20.0	±25.0
Chlorobenzene	0.400	20.0	±20.0	±25.0
Ethylbenzene	0.400	20.0	±20.0	±25.0

Analyte	Minimum RRF	Maximum %RSD	Opening Maximum %D[1]	Closing Maximum
m,p-Xylene	0.200	20.0	±20.0	±25.0
o-Xylene	0.200	20.0	±20.0	±25.0
Styrene	0.200	20.0	±20.0	±25.0
Bromoform	0.100	20.0	±25.0	±50.0
Isopropylbenzene	0.400	20.0	±25.0	±25.0
1,1,2,2-Tetrachloroethane	0.200	20.0	±25.0	±25.0
1,3-Dichlorobenzene	0.500	20.0	±20.0	±25.0
1,4-Dichlorobenzene	0.600	20.0	±20.0	±25.0
1,2-Dichlorobenzene	0.600	20.0	±20.0	±25.0
1,2-Dibromo-3-chloropropane	0.010	25.0	±30.0	±50.0
1,2,4-Trichlorobenzene	0.400	20.0	±30.0	±50.0
1,2,3-Trichlorobenzene	0.400	25.0	±30.0	±50.0
Deuterated Monitoring Compound				
Vinyl chloride-d_3	0.010	20.0	±30.0	±50.0
Chloroethane-d_5	0.010	40.0	±30.0	±50.0
1,1-Dichloroethene-d_2	0.050	20.0	±25.0	±25.0
2-Butanone-d_5	0.010	40.0	±40.0	±50.0
Chloroform-d	0.300	20.0	±20.0	±25.0
1,2-Dichloroethane-d_4	0.060	20.0	±25.0	±25.0
Benzene-d_6	0.300	20.0	±20.0	±25.0
1,2-Dichloropropane-d_6	0.200	20.0	±20.0	±25.0
Toluene-d_8	0.300	20.0	±20.0	±25.0
trans-1,3-Dichloropropene-d_4	0.200	20.0	±20.0	±25.0
2-Hexanone-d_5	0.010	40.0	±40.0	±50.0
1,1,2,2-Tetrachloroethane-d_2	0.200	20.0	±25.0	±25.0
1,2-Dichlorobenzene-d_4	0.400	20.0	±20.0	±25.0

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

Actions:

1. If any volatile target compound has an RRF value less than the minimum in the table, use professional judgment for detects, based on mass spectral identification, to qualify the data as estimated (J+ or R).
   a. If any volatile target compound has an RRF value less than the minimum criterion, qualify non-detected compounds as unusable (R).
   b. If any of the volatile target compounds listed in the Table has %RSD greater than the criteria, qualify detects as estimated (J), and non-detected compounds using professional judgment.
   c. If the volatile target compounds meet the acceptance criteria for RRF and the %RSD, no qualification of the data is necessary.

d. No qualification of the data is necessary on the DMC RRF and %RSD data alone. Use professional judgment and follow the guidelines in Action 2 to evaluate the DMC RRF and %RSD data in conjunction with the DMC recoveries to determine the need for qualification of data.

2. At the reviewer's discretion, and based on the project-specific Data Quality Objectives (DQOs), a more in-depth review may be considered using the following guidelines:
   a. If any volatile target compound has a %RSD greater than the maximum criterion in the Table, and if eliminating either the high or the low-point of the curve does not restore the %RSD to less than or equal to the required maximum:
      i. Qualify detects for that compound(s) as estimated (J).
      ii. Qualify non-detected volatile target compounds using professional judgment.
   b. If the high-point of the curve is outside of the linearity criteria (e.g., due to saturation):
      i. Qualify detects outside of the linear portion of the curve as estimated (J).
      ii. No qualifiers are required for detects in the linear portion of the curve.
      iii. No qualifiers are required for volatile target compounds that were not detected.
   c. If the low-point of the curve is outside of the linearity criteria:
      i. Qualify low-level detects in the area of non-linearity as estimated (J).
      ii. No qualifiers are required for detects in the linear portion of the curve.
      iii. For non-detected volatile compounds, use the lowest point of the linear portion of the curve to determine the new quantitation limit.

Note: If the laboratory has failed to provide adequate calibration information, inform the Region's designated representative to contact the laboratory and request the necessary information. If the information is not available, the reviewer must use professional judgment to assess the data.

State in the Data Review Narrative, if possible, the potential effects on the data due to calibration criteria exceedance.

Note, for the Laboratory COR action, if calibration criteria are grossly exceeded.

Table. Initial Calibration Actions for Low/Medium Volatile Analysis – Summary

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 for target analyte	Use professional judgment J+ or R	R
RRF > Minimum RRF in Table for target analyte	No qualification	No qualification
%RSD > Maximum %RSD in Table for target analyte	J	Use professional judgment
%RSD ≤ Maximum %RSD in Table for target analyte	No qualification	No qualification

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

Continuing Calibration Verification (CCV)

NOTE: Verify that the CCV was run at the required frequency (an opening and closing CCV must be run within 12-hour period) and the CCV was compared to the correct initial calibration. If the mid-point standard from the initial calibration is used as an opening CCV, verify that the result (RRF) of the mid-point standard was compared to the average RRF from the correct initial calibration.

The closing CCV used to bracket the end of a 12-hour analytical sequence may be used as the opening CCV for the new 12-hour analytical sequence, provided that all the technical acceptance criteria are met for an opening CCV (see criteria show before in the Table) . If the closing CCV does not meet the technical acceptance criteria for an opening CCV, then a BFB tune followed by an opening CCV is required and the next 12-hour time period begins with the BFB tune.

All DMCs must meet RRF criteria. No qualification of the data is necessary on the DMCs RRF and %RSD/%D data alone. However, use professional judgment to evaluate the DMC and %RSD/%D data in conjunction with the DMC recoveries to determine the need of qualification the data.

Action:

1. If a CCV (opening and closing) was not run at the appropriate frequency, qualify data using professional judgment.

2. Qualify all volatile target compounds in Table shown before using the following criteria:

   a. For an opening CCV, if any volatile target compound has an RRF value less than the minimum criterion, use professional judgment for detects, based on mass spectral identification, to qualify the data as estimated (J) and qualify non-detected compounds as unusable (R).
   b. For a closing CCV, if any volatile target compound has an RRF value less than the criteria, use professional judgment for detects based on mass spectral identification to qualify the data as estimated (J), and qualify non-detected compounds as unusable (R).
   c. For an opening CCV, if the Percent Difference value for any of the volatile target compounds is outside the limits in calibration criteria Table shown before, qualify detects as estimated (J) and non-detected compounds as estimated (UJ).
   d. For a closing CCV, if the Percent Difference value for any volatile target compound is outside the limits in calibration criteria table, qualify detects as estimated (J) and non-detected compounds as estimated (UJ).
   e. If the volatile target compounds meet the acceptable criteria for RRF and the Percent Difference, no qualification of the data is necessary.

f. No qualification of the data is necessary on the DMC RRF and the Percent Difference data alone. Use professional judgment to evaluate the DMC RRF and Percent Difference data in conjunction with the DMC recoveries to determine the need for qualification of data.

Notes: If the laboratory has failed to provide adequate calibration information, inform the Region's designated representative to contact the laboratory and request the necessary information. If the information is not available, the reviewer must use professional judgment to assess the data.

State in the Data Review Narrative, if possible, the potential effects on the data due to calibration criteria exceedance.

Note, for Contract Laboratory COR action, if calibration criteria are grossly exceeded.

Table. Continuing Calibration Actions for Low/Medium Volatile Analysis – Summary

Criteria for Opening CCV	Criteria for Closing CCV	Action	
		Detect	Non-detect
CCV not performed at required frequency	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 for target analyte	Use professional judgment J or R	R
RRF ≥ Minimum RRF in Table 2 for target analyte	RRF ≥ Minimum RRF in Table 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 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 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.

The concentration of a target analyte in any blank must not exceed its Contract Required Quantitation Limit (CRQL) (2x CRQLs for Methylene chloride, Acetone, and 2-Butanone). TIC concentration in any blanks must be ≤ 5.0 µg/L for water (0.0050 mg/L for TCLP leachate) and ≤ 5.0 µg/kg for soil matrices.

Laboratory blanks

The method blank, like any other sample in the SDG, must meet the technical acceptance criteria for sample analysis.

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
_No_target_analyte_detected_in_method_blanks._				

Field/Equipment/Trip blank

If field or trip blanks are present, the data reviewer should evaluate this data in a similar fashion as the method blanks.

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
_No_trip_blank_analyzed_with_this_data_package._Field/equipment_blanks_validated_in_another_ _project._				

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

BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

Note: All fields blank results associated with a particular group of samples (may exceed one per case) must be used to qualify data. Trip blanks are used to qualify only those samples with which they were shipped. Blanks may not be qualified because of contamination in another blank. Field blanks and trip blanks must be qualified for system monitoring compounds, instrument performance criteria, and spectral or calibration QC problems.

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

When applied as described in the Table below, the contaminant concentration in the blank is multiplied by the sample dilution factor.

Table. Blank and TCLP/SPLP LEB Actions for Low/Medium Volatile Analysis

Blank Type	Blank Result	Sample Result	Action for Samples
Method, Storage, Field, Trip, TCLP/SPLP LEB, Instrument**	Detects	Not detected	No qualification required
	< CRQL *	< CRQL*	Report CRQL value with a U
		≥ CRQL*	No qualification required
	> CRQL *	< CRQL*	Report CRQL value with a U
		≥ CRQL* and ≤ blank concentration	Report blank value for sample concentration with a U
		≥ CRQL* and > blank concentration	No qualification required
	= CRQL*	≤ CRQL*	Report CRQL value with a U
		> CRQL*	No qualification required
	Gross contamination	Detects	Report blank value for sample concentration with a U

* 2x the CRQL for methylene chloride, 2-butanone and acetone.
** Qualifications based on instrument blank results affect only the sample analyzed immediately after the sample that has target compounds that exceed the calibration range or non-target compounds that exceed 100 µg/L.

Action Levels (ALs) should be based upon the highest concentration of contaminant determined in any blank. Do not qualify any blank with another blank. The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. No positive sample results should be reported unless the concentration of the compound in the samples exceeds the ALs:

Notes:

High and low level blanks must be treated separately
Compounds qualified "U" for blank contamination are still considered "hits" when qualifying for calibration criteria.

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

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

DEUTERATED MONITORING COMPOUNDS (DMCs)

Laboratory performance of individual samples is established by evaluation of surrogate spike (DMCs) 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.

Table. Volatile Deuterated Monitoring Compounds (DMCs) and Recovery Limits

DMC	%R for Water Sample	%R for Soil Sample
Vinyl chloride-d3	60-135	30-150
Chloroethane-d5	70-130	30-150
1,1-Dichloroethene-d2	60-125	45-110
2-Butanone-d5	40-130	20-135
Chloroform-d	70-125	40-150
1,2-Dichloroethane-d4	70-125	70-130
Benzene-d6	70-125	20-135
1,2-Dichloropropane-d6	70-120	70-120
Toluene-d8	80-120	30-130
trans-1,3-Dichloropropene-d4	60-125	30-135
2-Hexanone-d5	45-130	20-135
1,1,2,2-Tetrachloroethane-d2	65-120	45-120
1,2-Dichlorobenzene-d4	80-120	75-120

NOTE: The recovery limits for any of the compounds listed in the above Table may be expanded at any time during the period of performance if the United States Environmental Protection Agency (EPA) determines that the limits are too restrictive.

Action:

Are recoveries for DMCs in volatile samples and blanks must be within the limits specified in the Table above. **Yes**? or No?

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

List the DMCs that may fail to meet the recovery limits

Sample ID	Date	DMCs	% Recovery	Action

Note: DMCs recoveries within the required limits and within the guidance document performance criteria (80 – 120. Other non-deuterated surrogates added to the samples within laboratory control limits.

Note: Any sample which has more than 3 DMCs outside the limits must be reanalyzed.

Action:

1. For any recovery greater than the upper acceptance limit:
   a. Qualify detected associated volatile target compounds as estimated high (J+).
   b. Do not qualify non-detected associated volatile target compounds.
2. For any recovery greater than or equal to 10%, and less than the lower acceptance limit:
   a. Qualify detected associated volatile target compounds as estimated low (J-).
   b. Qualify non-detected associated volatile target compounds as estimated (UJ).
3. For any recovery less than 10%:
   a. Qualify detected associated volatile target compounds as estimated low (J-).
   b. Qualify non-detected associated volatile target compounds as unusable (R).
4. For any recovery within acceptance limits, no qualification of the data is necessary.
5. In the special case of a blank analysis having DMCs out of specification, the reviewer must give special consideration to the validity of associated sample data. The basic concern is whether the blank problems represent an isolated problem with the blank alone, or whether there is a fundamental problem with the analytical process. For example, if one or more samples in the batch show acceptable DMC recoveries, the reviewer may choose to consider the blank problem to be an isolated occurrence. However, even if this judgment allows some use of the affected data, note analytical problems for Contract Laboratory COR action.
6. If more than three DMCs are outside of the recovery limits for Low/Medium volatiles analysis and the sample was not reanalyzed, note under Contract Problems/Non-Compliance.

Table. Deuterated Monitoring Compound (DMC) Recovery Actions for Low/Medium Volatiles Analyses – Summary

Criteria	Action	
	Detect Associated Compounds	Non-detected Associated Compounds
%R < 10%	J-	R
10% ≤ %R < Lower Acceptance Limit	J-	UJ
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualification	No qualification
%R > Upper Acceptance Limit	J+	No qualification

TABLE. VOLATILE DEUTERATED MONITORING COMPOUNDS (DMCs) AND THE ASSOCIATED TARGET COMPOUNDS

Vinyl chloride-d_3 (DMC-1)	**Chloroethane-d_5 (DMC-2)**	**1,1-Dichloroethene-d_2 (DMC-3)**
Vinyl chloride	Dichlorodifluoromethane Chloromethane Bromomethane Chloroethane Carbon disulfide	trans-1,2-Dichloroethene cis-1,2-Dichloroethene 1,1-Dichloroethene
2-Butanone-d_5 (DMC-4)	**Chloroform-d (DMC-5)**	**1,2-Dichloroethane-d_4 (DMC-6)**
Acetone 2-Butanone	1,1-Dichloroethane Bromochloromethane Chloroform Dibromochloromethane Bromoform	Trichlorofluoromethane 1,1,2-Trichloro-1,2,2-trifluoroethane Methyl acetate Methylene chloride Methyl-tert-butyl ether 1,1,1-Trichloroethane Carbon tetrachloride 1,2-Dibromoethane 1,2-Dichloroethane
Benzene-d_6 (DMC-7)	**1,2-Dichloropropane-d_6 (DMC-8)**	**Toluene-d_8 (DMC-9)**
Benzene	Cyclohexane Methylcyclohexane 1,2-Dichloropropane Bromodichloromethane	Trichloroethene Toluene Tetrachloroethene Ethylbenzene o-Xylene m,p-Xylene Styrene Isopropylbenzene
trans-1,3-Dichloropropene-d_4 (DMC-10)	**2-Hexanone-d_5 (DMC-11)**	**1,1,2,2-Tetrachloroethane-d_2 (DMC-12)**
cis-1,3-Dichloropropene trans-1,3-Dichloropropene 1,1,2-Trichloroethane	4-Methyl-2-pentanone 2-Hexanone	1,1,2,2,-Tetrachloroethane 1,2-Dibromo-3-chloropropane
1,2-Dichlorobenzene-d_4 (DMC-13)		
Chlorobenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene 1,2,3-Trichlorobenzene		

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

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.

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.

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.

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

Sample ID:_ JC33175-1MS/-1MSD____ Matrix/Level:_____Aqueous_____

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

Note:

* 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:

1. No qualification of the data is necessary on MS and MSD data alone. However, using professional judgment, the validator may use the MS and MSD results in conjunction with other QC criteria and determine the need for some qualification of the data.

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 _____

LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

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

1. LCS Recoveries Criteria

Where LCS spiked with the same analyte at the same concentrations as the MS/MSD? **Yes** or No. If no make note in data review memo.
List the %R of compounds which do not meet the criteria

LCS ID COMPOUND % R QC LIMIT

Recoveries(blank_spike)_within_laboratory_control_limits._____

Note:

* 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

All analytes in the associated sample results are qualified for the following criteria.

If 25 % of the LCS recoveries were < LL (or 70 %), qualify all positive results (j) and reject nondetects (R).
If two or more LCS were below 10 %, qualify all positive results as (J) and reject nondetects (R).

2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each 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.

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 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.

> **NOTE:** In the absence of QAPP guidance for validating data from field duplicates, the following action will be taken.

Identify which samples within the data package are field duplicates. Estimate the relative percent difference (RPD) between the values for each compound. Use professional judgment to note large RPDs (> 50%) in the narrative.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
No field/laboratory duplicate analyzed with this data package. MS/MSD % recoveries RPD used to assess precision. PRD within required criteria, ≤ 50 % for target analytes detected at concentration > 5x the SQL.					

Actions:

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.

If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions are suggested based on professional judgment:

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

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

If both sample and duplicate results are not detected, no action is needed.

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

X. 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.

DATE	SAMPLE ID	IS OUT	IS AREA	ACCEPTABLE RANGE	ACTION

Internal standard area counts within the required criteria for all samples.

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 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 20.0%, 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 30.0 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 30.0 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.

6. If required internal standard compounds are not added to a sample or blank, qualify detects and non-detects as unusable (R).
7. If the required internal standard compound is not analyzed at the specified concentration in a sample or blank, use professional judgment to qualify detects and non-detects.

Table. Internal Standard Actions for Low/Medium Volatiles Analyses - Summary

Criteria	Action	
	Detected Associated Compounds*	Non-detected Associated Compounds*
Area counts > 200% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	J-	No qualification
Area counts < 20% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	J+	R
Area counts ≥ 50% but ≤ 200% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	No qualification	
RT difference > 30.0 seconds between samples and 12-hour standard (opening CCV or mid-point standard from initial calibration)	R **	R
RT difference ≤ 30.0 seconds between samples and 12-hour standard (opening CCV or mid-point standard from initial calibration)	No qualification	

* For volatile compounds associated to each internal standard, see TABLE - VOLATILE TARGET ANALYTES, DEUTERATED MONITORING COMPOUNDS WITH ASSOCIATED INTERNAL STANDARDS FOR QUANTITATION in SOM02.2, Exhibit D, available at: http://www.epa.gov/superfund/programs/clp/download/som/som22d.pdf
** Detects should not need to be qualified as unusable (R) if the mass spectral criteria are met.

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

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. 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.
2. For non-aqueous samples, in the percent moisture is less than 70.0%, no qualification of the data is necessary. If the percent moisture is greater than or equal to 70.0% and less than 90.0%, qualify detects as estimated (J) and non-detects as approximated (UJ). If the percent moisture is greater than or equal to 90.0%, qualify detects as estimated (J) and non-detects as unusable (R) (see Table below).
3. Note, for Contract Laboratory COR action, numerous or significant failures to accurately quantify the target compounds or to properly evaluate and adjust CRQLs.
4. Results between MDL and CRQL should be qualified as estimated "J".
5. Results < MDL should be reported at the CRQL and qualified "U". MDLs themselves are not reported.

Table. Percent Moisture Actions for Low/Medium Volatiles Analysis for Non-Aqueous Samples

Criteria	**Action**	
	Detected Associated Compounds	**Non-detected Associated Compounds**
% Moisture < 70.0	No qualification	
70.0 < % Moisture < 90.0	J	UJ
% Moisture > 90.0	J	R

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

Sample ID

JC33175-1 MS 1,3-butadiene RF = 0.619

[ ] = (181565)(50)/(0.619)(264827) = 55.4 ppb Ok

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

B. Percent Solids

List samples which have ≥ 70 % solids

_____
_____
_____
_____
_____
_____

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 ____

OTHER ISSUES

A. System Performance

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

Sample ID	Comments	Actions
_No_degradation_of_system_performance_observed.		

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_additional_issues_observed_that_require_qualification_of_the_data._Results_are_valid_and__ _can_be_used_for_decission_purposes._____		

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).

EXECUTIVE NARRATIVE

SDG No:	JC33175	Laboratory:	Accutest, New Jersey
Analysis:	SW846-8270D	Number of Samples:	3
Location:	BMSMC, Building 5 Area Humacao, PR		

SUMMARY: Three (3) samples were analyzed for SVOCs from the special TCL list following method SW846-8270D; Selected PAHs and 1,4-Dioxane were also analyzed by SW846-8270D using the selective ion monitoring (SIM) technique. 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. All samples extracted and analyzed within method recommended holding time except for the following: JC33175-1 for 4,6-Dinitro-o-cresol: This compound outside control limits biased low in the associated BS. The result was confirmed by re-extraction outside the holding time. No action taken.

2. Initial and continuing calibration verifications meet the method and guidance document required performance criteria except in the cases described in the Data Review Worksheet. Results for 4-Nitrophenol were qualified as estimated (J or UJ) in affected samples.

No closing calibration verification included in data package. No action taken, professional judgment.

QC samples were not validated.

3. BS recovery for 4,6-Dinitro-o-cresol was outside control limits biased low. The result of this analyte in the corresponding sample was confirmed by re-extraction outside the holding time. No action taken.

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

Reviewers Name: Rafael Infante
Chemist License 1888

Signature: Rafael Infante
Date: January 12, 2017

SAMPLE ORGANIC DATA SAMPLE SUMMARY

Sample ID: JC33175-1
Sample location: BMSMC Building 5 Area
Sampling date: 12/6/2016
Matrix: Groundwater

METHOD: 8270D

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
2-Chlorophenol	5.3	ug/l	1	-	U	Yes
4-Chloro-3-methyl phenol	5.3	ug/l	1	-	U	Yes
2,4-Dichlorophenol	2.1	ug/l	1	-	U	Yes
2,4-Dimethylphenol	5.3	ug/l	1	-	U	Yes
2,4-Dinitrophenol	11	ug/l	1	-	U	Yes
4,6-Dinitro-o-cresol	5.3	ug/l	1	-	U	Yes
2-Methylphenol	2.1	ug/l	1	-	U	Yes
3&4-Methylphenol	2.1	ug/l	1	-	U	Yes
2-Nitrophenol	5.3	ug/l	1	-	U	Yes
4-Nitrophenol	11	ug/l	1	-	UJ	Yes
Pentachlorophenol	5.3	ug/l	1	-	U	Yes
Phenol	2.1	ug/l	1	-	U	Yes
2,3,4,6-Tetrachlorophenol	5.3	ug/l	1	-	U	Yes
2,4,5-Trichlorophenol	5.3	ug/l	1	-	U	Yes
2,4,6-Trichlorophenol	5.3	ug/l	1	-	U	Yes
Acenaphthene	1.1	ug/l	1	-	U	Yes
Acenaphthylene	1.1	ug/l	1	-	U	Yes
Acetophenone	2.1	ug/l	1	-	U	Yes
Anthracene	1.9	ug/l	1	-	-	Yes
Atrazine	2.1	ug/l	1	-	U	Yes
Benzaldehyde	5.3	ug/l	1	-	U	Yes
Benzo(a)anthracene	1.1	ug/l	1	-	U	Yes
Benzo(a)pyrene	1.1	ug/l	1	-	U	Yes
Benzo(b)fluoranthene	1.1	ug/l	1	-	U	Yes
Benzo(g,h,i)perylene	1.1	ug/l	1	-	U	Yes
Benzo(k)fluoranthene	1.1	ug/l	1	-	U	Yes
4-Bromophenyl phenyl ether	1.1	ug/l	1	-	U	Yes
Butyl benzyl phthalate	2.1	ug/l	1	-	U	Yes
1,1'-Biphenyl	1.1	ug/l	1	-	U	Yes
2-Chloronaphthalene	2.1	ug/l	1	-	U	Yes
4-Chloroaniline	5.3	ug/l	1	-	U	Yes
Carbazole	1.1	ug/l	1	-	U	Yes
Caprolactam	2.1	ug/l	1	-	U	Yes
Chrysene	1.1	ug/l	1	-	U	Yes
bis(2-Chloroethoxy)methane	2.1	ug/l	1	-	U	Yes

bis(2-Chloroethyl)ether	2.1	ug/l	1	-	U	Yes
bis(2-Chloroisopropyl)ether	2.1	ug/l	1	-	U	Yes
4-Chlorophenyl phenyl ether	2.1	ug/l	1	-	U	Yes
2,4-Dinitrotoluene	1.1	ug/l	1	-	U	Yes
2,6-Dinitrotoluene	1.1	ug/l	1	-	U	Yes
3,3'-Dichlorobenzidine	2.1	ug/l	1	-	U	Yes
Dibenzo(a,h)anthracene	1.1	ug/l	1	-	U	Yes
Dibenzofuran	5.3	ug/l	1	-	U	Yes
Di-n-butyl phthalate	2.1	ug/l	1	-	U	Yes
Di-n-octyl phthalate	2.1	ug/l	1	-	U	Yes
Diethyl phthalate	2.1	ug/l	1	-	U	Yes
Dimethyl phthalate	2.1	ug/l	1	-	U	Yes
bis(2-Ethylhexyl)phthalate	2.1	ug/l	1	-	U	Yes
Fluoranthene	1.1	ug/l	1	-	U	Yes
Fluorene	1.1	ug/l	1	-	U	Yes
Hexachlorobenzene	1.1	ug/l	1	-	U	Yes
Hexachlorobutadiene	1.1	ug/l	1	-	U	Yes
Hexachlorocyclopentadiene	11	ug/l	1	-	U	Yes
Hexachloroethane	2.1	ug/l	1	-	U	Yes
Indeno(1,2,3-cd)pyrene	1.1	ug/l	1	-	U	Yes
Isophorone	2.1	ug/l	1	-	U	Yes
2-Methylnaphthalene	1.1	ug/l	1	-	U	Yes
2-Nitroaniline	5.3	ug/l	1	-	U	Yes
3-Nitroaniline	5.3	ug/l	1	-	U	Yes
4-Nitroaniline	5.3	ug/l	1	-	U	Yes
Nitrobenzene	2.1	ug/l	1	-	U	Yes
N-Nitroso-di-n-propylamine	2.1	ug/l	1	-	U	Yes
Nitrosodiphenylamine	5.3	ug/l	1	-	U	Yes
Phenanthrene	1.1	ug/l	1	-	U	Yes
Pyrene	1.1	ug/l	1	-	U	Yes
1,2,4,5-Tetrachlorobenzene	2.1	ug/l	1	-	U	Yes
METHOD: 8270D (SIM)						
Benzo(a)anthracene	0.053	ug/l	1	-	UJ	Yes
Benzo(a)pyrene	0.053	ug/l	1	-	U	Yes
Benzo(b)fluoranthene	0.11	ug/l	1	-	UJ	Yes
Benzo(k)fluoranthene	0.11	ug/l	1	-	U	Yes
Chrysene	0.11	ug/l	1	-	U	Yes
Dibenzo(a,h)anthracene	0.11	ug/l	1	-	U	Yes
Indeno(1,2,3-cd)pyrene	0.11	ug/l	1	-	U	Yes
Naphthalene	0.11	ug/l	1	-	U	Yes
1,4-Dioxane	0.910	ug/l	1	-	-	Yes

Sample ID: JC33175-1MS
Sample location: BMSMC Building 5 Area
Sampling date: 12/6/2016
Matrix: Groundwater

METHOD: 8270D

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
2-Chlorophenol	65.3	ug/l	1	-	-	Yes
4-Chloro-3-methyl phenol	91.7	ug/l	1	-	-	Yes
2,4-Dichlorophenol	79.1	ug/l	1	-	-	Yes
2,4-Dimethylphenol	96.5	ug/l	1	-	-	Yes
2,4-Dinitrophenol	196	ug/l	1	-	-	Yes
4,6-Dinitro-o-cresol	95.9	ug/l	1	-	-	Yes
2-Methylphenol	73.1	ug/l	1	-	-	Yes
3&4-Methylphenol	71.3	ug/l	1	-	-	Yes
2-Nitrophenol	75.2	ug/l	1	-	-	Yes
4-Nitrophenol	83.8	ug/l	1	-	J	Yes
Pentachlorophenol	97.5	ug/l	1	-	-	Yes
Phenol	42.1	ug/l	1	-	-	Yes
2,3,4,6-Tetrachlorophenol	84.7	ug/l	1	-	-	Yes
2,4,5-Trichlorophenol	84.3	ug/l	1	-	-	Yes
2,4,6-Trichlorophenol	91.5	ug/l	1	-	-	Yes
Acenaphthene	85.6	ug/l	1	-	-	Yes
Acenaphthylene	82.8	ug/l	1	-	-	Yes
Acetophenone	86.2	ug/l	1	-	-	Yes
Anthracene	83.6	ug/l	1	-	-	Yes
Atrazine	85.7	ug/l	1	-	-	Yes
Benzaldehyde	68.0	ug/l	1	-	-	Yes
Benzo(a)anthracene	86.4	ug/l	1	-	-	Yes
Benzo(a)pyrene	84.7	ug/l	1	-	-	Yes
Benzo(b)fluoranthene	89.7	ug/l	1	-	-	Yes
Benzo(g,h,i)perylene	87.4	ug/l	1	-	-	Yes
Benzo(k)fluoranthene	86.4	ug/l	1	-	-	Yes
4-Bromophenyl phenyl ether	94.9	ug/l	1	-	-	Yes
Butyl benzyl phthalate	85.4	ug/l	1	-	-	Yes
1,1'-Biphenyl	85.5	ug/l	1	-	-	Yes
2-Chloronaphthalene	84.7	ug/l	1	-	-	Yes
4-Chloroaniline	52.7	ug/l	1	-	-	Yes
Carbazole	82.1	ug/l	1	-	-	Yes
Caprolactam	26.9	ug/l	1	-	-	Yes
Chrysene	80.6	ug/l	1	-	-	Yes
bis(2-Chloroethoxy)methane	97.4	ug/l	1	-	-	Yes
bis(2-Chloroethyl)ether	92.3	ug/l	1	-	-	Yes
bis(2-Chloroisopropyl)ether	83.0	ug/l	1	-	-	Yes

4-Chlorophenyl phenyl ether	99.1	ug/l	1	-	-	Yes
2,4-Dinitrotoluene	94.8	ug/l	1	-	-	Yes
2,6-Dinitrotoluene	89.5	ug/l	1	-	-	Yes
3,3'-Dichlorobenzidine	137	ug/l	1	-	-	Yes
Dibenzo(a,h)anthracene	91.0	ug/l	1	-	-	Yes
Dibenzofuran	87.8	ug/l	1	-	-	Yes
Di-n-butyl phthalate	88.1	ug/l	1	-	-	Yes
Di-n-octyl phthalate	88.8	ug/l	1	-	-	Yes
Diethyl phthalate	93.8	ug/l	1	-	-	Yes
Dimethyl phthalate	86.7	ug/l	1	-	-	Yes
bis(2-Ethylhexyl)phthalate	84.2	ug/l	1	-	-	Yes
Fluoranthene	87.7	ug/l	1	-	-	Yes
Fluorene	87.6	ug/l	1	-	-	Yes
Hexachlorobenzene	91.1	ug/l	1	-	-	Yes
Hexachlorobutadiene	79.1	ug/l	1	-	-	Yes
Hexachlorocyclopentadiene	169	ug/l	1	-	-	Yes
Hexachloroethane	66.1	ug/l	1	-	-	Yes
Indeno(1,2,3-cd)pyrene	88.0	ug/l	1	-	-	Yes
Isophorone	92.3	ug/l	1	-	-	Yes
2-Methylnaphthalene	77.6	ug/l	1	-	-	Yes
2-Nitroaniline	114	ug/l	1	-	-	Yes
3-Nitroaniline	59.7	ug/l	1	-	-	Yes
4-Nitroaniline	74.5	ug/l	1	-	-	Yes
Nitrobenzene	94.6	ug/l	1	-	-	Yes
N-Nitroso-di-n-propylamine	94.1	ug/l	1	-	-	Yes
Nitrosodiphenylamine	79.8	ug/l	1	-	-	Yes
Phenanthrene	81.0	ug/l	1	-	-	Yes
Pyrene	85.4	ug/l	1	-	-	Yes
1,2,4,5-Tetrachlorobenzene	96.5	ug/l	1	-	-	Yes
METHOD: 8270D (SIM)						
Benzo(a)anthracene	2.39	ug/l	1	-	J	Yes
Benzo(a)pyrene	1.72	ug/l	1	-	-	Yes
Benzo(b)fluoranthene	2.10	ug/l	1	-	-	Yes
Benzo(k)fluoranthene	2.04	ug/l	1	-	J	Yes
Chrysene	1.83	ug/l	1	-	-	Yes
Dibenzo(a,h)anthracene	1.86	ug/l	1	-	-	Yes
Indeno(1,2,3-cd)pyrene	2.04	ug/l	1	-	-	Yes
Naphthalene	1.58	ug/l	1	-	-	Yes
1,4-Dioxane	1.89	ug/l	1	-	-	Yes

Sample ID: JC33175-1MSD
Sample location: BMSMC Building 5 Area
Sampling date: 12/6/2016
Matrix: Groundwater

METHOD: 8270D

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
2-Chlorophenol	63.1	ug/l	1	-	-	Yes
4-Chloro-3-methyl phenol	85.1	ug/l	1	-	-	Yes
2,4-Dichlorophenol	74.5	ug/l	1	-	-	Yes
2,4-Dimethylphenol	91.7	ug/l	1	-	-	Yes
2,4-Dinitrophenol	183	ug/l	1	-	-	Yes
4,6-Dinitro-o-cresol	89.6	ug/l	1	-	-	Yes
2-Methylphenol	70.4	ug/l	1	-	-	Yes
3&4-Methylphenol	69.3	ug/l	1	-	-	Yes
2-Nitrophenol	72.4	ug/l	1	-	-	Yes
4-Nitrophenol	82.6	ug/l	1	-	J	Yes
Pentachlorophenol	87.3	ug/l	1	-	-	Yes
Phenol	39.9	ug/l	1	-	-	Yes
2,3,4,6-Tetrachlorophenol	80.5	ug/l	1	-	-	Yes
2,4,5-Trichlorophenol	81.7	ug/l	1	-	-	Yes
2,4,6-Trichlorophenol	86.2	ug/l	1	-	-	Yes
Acenaphthene	78.5	ug/l	1	-	-	Yes
Acenaphthylene	76.7	ug/l	1	-	-	Yes
Acetophenone	81.5	ug/l	1	-	-	Yes
Anthracene	79.0	ug/l	1	-	-	Yes
Atrazine	82.3	ug/l	1	-	-	Yes
Benzaldehyde	66.3	ug/l	1	-	-	Yes
Benzo(a)anthracene	81.4	ug/l	1	-	-	Yes
Benzo(a)pyrene	79.9	ug/l	1	-	-	Yes
Benzo(b)fluoranthene	86.8	ug/l	1	-	-	Yes
Benzo(g,h,i)perylene	83.2	ug/l	1	-	-	Yes
Benzo(k)fluoranthene	82.3	ug/l	1	-	-	Yes
4-Bromophenyl phenyl ether	87.7	ug/l	1	-	-	Yes
Butyl benzyl phthalate	80.9	ug/l	1	-	-	Yes
1,1'-Biphenyl	80.7	ug/l	1	-	-	Yes
2-Chloronaphthalene	80.2	ug/l	1	-	-	Yes
4-Chloroaniline	39.4	ug/l	1	-	-	Yes
Carbazole	75.1	ug/l	1	-	-	Yes
Caprolactam	24.8	ug/l	1	-	-	Yes
Chrysene	76.6	ug/l	1	-	-	Yes
bis(2-Chloroethoxy)methane	92.5	ug/l	1	-	-	Yes
bis(2-Chloroethyl)ether	89.1	ug/l	1	-	-	Yes

bis(2-Chloroisopropyl)ether	77.8	ug/l	1	-	-	Yes
4-Chlorophenyl phenyl ether	93.5	ug/l	1	-	-	Yes
2,4-Dinitrotoluene	90.0	ug/l	1	-	-	Yes
2,6-Dinitrotoluene	84.5	ug/l	1	-	-	Yes
3,3'-Dichlorobenzidine	110	ug/l	1	-	-	Yes
Dibenzo(a,h)anthracene	86.0	ug/l	1	-	-	Yes
Dibenzofuran	81.4	ug/l	1	-	-	Yes
Di-n-butyl phthalate	82.2	ug/l	1	-	-	Yes
Di-n-octyl phthalate	85.2	ug/l	1	-	-	Yes
Diethyl phthalate	86.3	ug/l	1	-	-	Yes
Dimethyl phthalate	81.4	ug/l	1	-	-	Yes
bis(2-Ethylhexyl)phthalate	79.0	ug/l	1	-	-	Yes
Fluoranthene	82.3	ug/l	1	-	-	Yes
Fluorene	82.9	ug/l	1	-	-	Yes
Hexachlorobenzene	87.4	ug/l	1	-	-	Yes
Hexachlorobutadiene	76.3	ug/l	1	-	-	Yes
Hexachlorocyclopentadiene	158	ug/l	1	-	-	Yes
Hexachloroethane	64.6	ug/l	1	-	-	Yes
Indeno(1,2,3-cd)pyrene	84.3	ug/l	1	-	-	Yes
Isophorone	87.2	ug/l	1	-	-	Yes
2-Methylnaphthalene	71.4	ug/l	1	-	-	Yes
2-Nitroaniline	105	ug/l	1	-	-	Yes
3-Nitroaniline	52.0	ug/l	1	-	-	Yes
4-Nitroaniline	68.8	ug/l	1	-	-	Yes
Nitrobenzene	91.1	ug/l	1	-	-	Yes
N-Nitroso-di-n-propylamine	88.8	ug/l	1	-	-	Yes
Nitrosodiphenylamine	75.0	ug/l	1	-	-	Yes
Phenanthrene	76.4	ug/l	1	-	-	Yes
Pyrene	79.1	ug/l	1	-	-	Yes
1,2,4,5-Tetrachlorobenzene	90.1	ug/l	1	-	-	Yes
METHOD: 8270D (SIM)						
Benzo(a)anthracene	2.34	ug/l	1	-	J	Yes
Benzo(a)pyrene	1.54	ug/l	1	-	-	Yes
Benzo(b)fluoranthene	1.87	ug/l	1	-	J	Yes
Benzo(k)fluoranthene	1.79	ug/l	1	-	-	Yes
Chrysene	1.89	ug/l	1	-	-	Yes
Dibenzo(a,h)anthracene	1.62	ug/l	1	-	-	Yes
Indeno(1,2,3-cd)pyrene	1.76	ug/l	1	-	-	Yes
Naphthalene	1.57	ug/l	1	-	-	Yes
1,4-Dioxane	2.40	ug/l	1	-	-	Yes

DATA REVIEW WORKSHEETS

Project Number:_JC33175_____
Date:_____December_6,_2016_____
Shipping Date:___December_6,_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.: ____JC33175_____ Sample matrix: ____Groundwater___
No. of Samples: _____3_SIM/3_SCAN_____

Trip blank No.: _____-_____
Field blank No.: _____FB1206/16_____
Equipment blank No.:_____EB120616_____
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:_SVOCs_TCL_special_list_analyzed_by_method_SW846-8270D;__PAHs_and___
_1,4-Dioxane_analyzed_by_method_SW846-8270D_(SIM)_____

Definition of Qualifiers:

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

Reviewer:_Rafael Infante_____
Date:___January_12,_2017_____

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 except for the following: JC33175-1 for 4,6-Dinitro-o-cresol: This compound outside control limits biased low in the associated BS. The result was confirmed by re-extraction outside the holding time. No action taken.				

Cooler temperature (Criteria: 4 ± 2 °C): _____5.9°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	Action: 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:_____10/18/16_(SIM)____
Instrument ID numbers:_____GCMS3P_____
Matrix/Level:_____Aqueous/low_____

Date of initial calibration:_12/08/16_(SCAN)_____
Instrument ID numbers:_____GCMS3E_____
Matrix/Level:_____Aqueous/low_____

_____11/22/16_(SCAN)_____
_____GCMSM_____
_____Aqueous/low_____

Date of initial calibration:___11/18/16_(SCAN)___
Instrument ID numbers:_____GCMS6P_____
Matrix/Level:_____Aqueous/low_____

_____11/28-29/16_(SCAN)____
_____GCMSP_____
_____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.				

Note:

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:_____10/18/16_(SIM)_____
Date of initial calibration verification (ICV):___10/19/16_____
Date of continuing calibration verification (CCV):_12/14/16_____
Date of closing CCV:_____-_____
Instrument ID numbers:_____GCMS3P_____
Matrix/Level:_____Aqueous/low_____

Date of initial calibration:_____12/08/16_(Scan)_____
Date of initial calibration verification (ICV):_12/08-09/16_____
Date of continuing calibration verification (CCV):____12/15/16_____
Date of closing CCV:_____-_____
Instrument ID numbers:_____GCMSP_____
Matrix/Level:_____Aqueous/low_____

Date of initial calibration:_____11/18/16_(Scan)_____
Date of initial calibration verification (ICV):_11/18-11/21/16_____
Date of continuing calibration verification (CCV):_12/14/16_____
Date of closing CCV:_____-_____
Instrument ID numbers:_____GCMS6P_____
Matrix/Level:_____Aqueous/low_____

Date of initial calibration:_____11/22/16_(Scan)_____
Date of initial calibration verification (ICV):_11/22-11/28/16_____
Date of continuing calibration verification (CCV):_12/16/16_____
Date of closing CCV:_____-_____
Instrument ID numbers:_____GCMSM_____
Matrix/Level:_____Aqueous/low_____

Date of initial calibration:_____11/28-29/16_(Scan)_____
Date of initial calibration verification (ICV):_11/29-30/16_____
Date of continuing calibration verification (CCV):_12/14/16_____
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
GCMS3P				
12/14/16	cc2579-0.5	-42.3 % ✓	Benzo(a)anthracene	JC33175-1; -1MS/-1MSD
		-36.0 % ✓	Benzo(b)fluoranthene	
GCMS6P				
12/14/16	cc1488-50	-23.0 % ✓	Hexachlorocyclopentadiene*	JC33175-1; -1MS/-1MSD
		-23.0 % ✓	2-nitroaniline*	
		-40.7 % ✓	4-nitrophenol	
	cc1489-50	23.0 % ✓	Benzaldehyde*	

Note: Initial and continuing calibration verifications meet the method and guidance document required performance criteria except for the cases described in this document. Results not meeting the performance criteria qualified in affected samples (J or UJ).

* Continuing calibration % difference outside the method performance criteria but within the guidance document performance criteria. No action taken.

QC samples analyzed on instruments GCMSP and GCMS3E not validated.

Confirmation run analyzed on instrument GCMSM not validated.

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 _____
Criteria were not met
and/or see below ____X_____

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_except_for_the_followings:_____				
_12/14/16_____	_OP99167-MB1_	Aq./low_____	_bis(2-Ethylhexyl)phthalate_	_4.2_ug/L_____
_12/15/16_____	_OP99167-MB1_	Aq./low_____	_bis(2-Ethylhexyl)phthalate_	_4.7_ug/L_____

Note: No action taken, analyte is a common laboratory contaminant and not detected in the sample.

Field/Equipment/Trip blank

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

Note:

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_in_all_samples_analyzed._Non-deuterated_surrogates_____
_added_to_the_samples_and_were_within_laboratory_recovery_limits._____

_____

(a) Outside control limits due to matrix interference.
(b) Outside in house control limits biased low. The results confirmed by re-extraction outside the holding time.

Note:

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 _____
Criteria were not met
and/or see below ____X___

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:_____JC33175-1_____ Matrix/Level:_____Groundwater___
Sample ID:_____JC33175-1_(SIM)_____ Matrix/Level:_____Groundwater___

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

* 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 for batch samples corresponding to this data package.

Action:

1. If an internal standard area count for a sample or blank is greater than 213.0% 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 213% 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:__ JC33175-1__(SIM)__ Analyte:__Naphthalene__ RF:_2.580_

[ ] = (11578)(4.0)/(23961)(2.580)
= 0.75 ppm Ok

DATA REVIEW WORKSHEETS

QUANTITATION LIMITS

A. Dilution performed

SAMPLE ID	DILUTION FACTOR	REASON FOR DILUTION

All criteria were met ___N/A___
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
Field/laboratory duplicate not analyzed as part of this data package. MS/MSD % recovery RPD used to assess precision. RPD within the required guidance document 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:

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

EXECUTIVE NARRATIVE

SDG No:	**JC33175**	Laboratory:	**Accutest, New Jersey**
Analysis:	**SW846-8015C**	Number of Samples:	**3**
Location:	BMSMC, Building 5 Area Humacao, PR		

SUMMARY: Three (3) samples were analyzed for the low molecular weight alcohols (LMWAs) list following method SW846-8015C. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846 (Final Update III, December 1996)," specifically for Methods 8000/8015C are utilized. 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, continuing, and final calibration verifications meets method specific criteria in at least one of the two columns except for the cases described the Data Review Worksheet. Final calibration verification included in data packages.

Analytes not meeting the calibration performance criteria qualified (J) or (UJ) in affected samples.

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

Reviewers Name: Rafael Infante
Chemist License 1888

Signature: Rafael Infante

Date: January 11, 2017

SAMPLE ORGANIC DATA SAMPLE SUMMARY

Sample ID: JC33175-1
Sample location: BMSMC Building 5 Area
Sampling date: 12/6/2016
Matrix: Groundwater

METHOD: 8015C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ethanol	200	ug/l	1.0	-	UJ	Yes
Isobutyl Alcohol	100	ug/l	1.0	-	U	Yes
Isopropyl Alcohol	100	ug/l	1.0	-	U	Yes
n-Propyl Alcohol	100	ug/l	1.0	-	U	Yes
n-Butyl Alcohol	100	ug/l	1.0	-	U	Yes
sec-Butyl Alcohol	100	ug/l	1.0	-	U	Yes
Methanol	200	ug/l	1.0	-	U	Yes

Sample ID: JC33175-1MS
Sample location: BMSMC Building 5 Area
Sampling date: 12/6/2016
Matrix: Groundwater

METHOD: 8015C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ethanol	3820	ug/l	1.0	-	J	Yes
Isobutyl Alcohol	4380	ug/l	1.0	-	-	Yes
Isopropyl Alcohol	3590	ug/l	1.0	-	-	Yes
n-Propyl Alcohol	4050	ug/l	1.0	-	-	Yes
n-Butyl Alcohol	6450	ug/l	1.0	-	-	Yes
sec-Butyl Alcohol	5200	ug/l	1.0	-	-	Yes
Methanol	3990	ug/l	1.0	-	-	Yes

Sample ID: JC33175-1MSD
Sample location: BMSMC Building 5 Area
Sampling date: 16/6/16
Matrix: Groundwater

METHOD: 8015C

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Ethanol	4470	ug/l	1.0	-	J	Yes ✓
Isobutyl Alcohol	5470	ug/l	1.0	-	-	Yes
Isopropyl Alcohol	3950	ug/l	1.0	-	-	Yes
n-Propyl Alcohol	5540	ug/l	1.0	-	-	Yes
n-Butyl Alcohol	6000	ug/l	1.0	-	-	Yes
sec-Butyl Alcohol	5080	ug/l	1.0	-	-	Yes
Methanol	3810	ug/l	1.0	-	-	Yes

DATA REVIEW WORKSHEETS

Project Number:___JC33175_____
Date:_____12/06/2016_____
Shipping Date:____12/06/2016_____
EPA Region:_____2_____

REVIEW OF VOLATILE 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: "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846 (Final Update III, December 1996)," specifically for Methods 8000/8015C are utilized. 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 modified data review for VOCs included:

Lab. Project/SDG No.: __JC33175_____ Sample matrix: ____Groundwater_____
No. of Samples: _____3_____

Trip blank No.: _____-_____
Field blank No.: _____FB120616_____
Equipment blank No.:___EB120616_____
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:_Low_molecular_weight_alcohols_by_SW-846_8015C._Field_and_equipment_ _blanks_validated_in_another_job._____

Definition of Qualifiers:

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

Reviewer: Rafael Infante
Date:__January_11,_2017_____

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 ANALYZED	pH	ACTION
All samples analyzed within the recommended method holding. All samples properly preserved.				

Criteria

Aqueous samples – 14 days from sample collection for preserved samples (pH $\leq$ 2, 4°C), no air bubbles.
Aqueous samples – 7 days from sample collection for unpreserved samples, 4°C, no air bubbles.
Soil samples- 7 days from sample collection.
Cooler temperature (Criteria: 4 $\pm$ 2 °C): 5.9°C

Actions

If the VOCs vial(s) have air bubbles, estimate positive results (J) and reject nondetects (R).
If the % solids of soil samples is 10-50%, estimates positive results (J) and nondetects (UJ)
If the % solid of soil samples is < 10%, estimate positive results (J) and reject nondetects (R).
If holding times are exceeded but < 14 days beyond criteria, estimate positive results (J) and nondetects (UJ).
If holding times are exceeded but < 28 days beyond criteria, estimate positive results (J) and reject nondetects (R).
If holding times are grossly exceeded (> 28 days beyond criteria), reject all results (R).
If samples were not iced or if the ice were melted (> 10°C), estimate positive results (J) and nondetects (UJ).

All criteria were met __N/A__
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

__N/A_ The BFB performance results were reviewed and found to be within the specified criteria.

__N/A_ BFB 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.

List the samples affected: _____

If mass calibration is in error, all associated data are rejected.

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

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:_____10/10/16_____
Dates of continuing calibration:_____12/15/16;_09/29/16;_____
Dates of final calibration verification:___12/15/16;_09/29/16_____
Instrument ID number:_____GCGH_____
Matrix/Level:_____Aqueous/low_____

DATE	LAB FILE ID#	CRITERIA OUT RFs, %RSD, %D, r	COMPOUND	SAMPLES AFFECTED
12/15/16	CC5519-5000	-58.9/-27.6	Ethanol	JC33175-1; -1MS/-1MSD

Note: Initial, continuing, and final calibration verifications meets method specific criteria in at least one of the two columns except for the cases described in this document. Final calibration verification included in data packages. Analytes not meeting the calibration performance criteria qualified (J) or (UJ) in affected samples.

Criteria

All RFs must be > 0.05 regardless of method requirements for SPCC.
All %RSD must be ≤ 15 % regardless of method requirements for CCC.
All %Ds must be ≤ 20% regardless of method requirements for CCC.
It should be noted that Region 2 SOP HW-24 does not specify criterion for the curve correlation coefficient (r). A limit for r of ≥ 0.995 has therefore been utilized as professional judgment.

Actions

If any compound has an initial RF or a continuing RF of < 0.05, estimate positive results (J) and reject nondetects (R), regardless of method requirements.
If any compound has a %RSD > 15%, estimate positive results (J) and use professional judgment to qualify nondetects.
If any compound has a %RSD > 90%, estimate positive results (J) and reject nondetects (R).
If any compound has a % D > 20%, estimate positive results (J) and reject nondetects (R).
If any compound has a % D > 20%, estimate positive results (J) and nondetects (UJ).
If any compound has a % D > 90%, estimate positive results (J) and reject nondetects (R).
If any compound has r < 0.995, estimate positive results and nondetects.

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.

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
____All_method_blank_meeth_method_specific_criteria_____				

Field/Equipment/Trip blank

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS

_No_field/trip/equipment_blanks_included_in_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

Action Levels (ALs) should be based upon the highest concentration of contaminant determined in any blank. Do not qualify any blank with another blank. The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. No positive sample results should be reported unless the concentration of the compound in the samples exceeds the ALs:

ALs = 10x the amount of common contaminants (methylene chloride, acetone, 2-butanone, and toluene)
ALs = 5x for any other compounds

Specific actions are 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 ≥ SQL and > AL, report the concentration unqualified.

Notes:

High and low level blanks must be treated separately
Compounds qualified "U" for blank contamination are still considered "hits" when qualifying for calibration criteria.

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

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
	Hexanol	~~DBFM~~	~~TOL-d8~~	~~BFB~~	
	S1 a	S1 b			
JC33175-1	85	84			
GGH5589-BS	98	106			
GGH5589-MB1	89	97			
JC33175-1MS	91	81			
JC33175-1MSD	91	92			

(a) Recovery from GC signal #2
(b) Recovery from GC signal #1

Note: All surrogate recoveries within laboratory control limits.

QC Limits* (Aqueous)
_____LL_to_UL___ _56_to_145_ ___to_____ ___to_____ ___to_____
QC Limits* (Solid-Low)
_____LL_to_UL___ ____to_____ ___to_____ ___to_____ ___to_____
QC Limits* (Solid-Med)
_____LL_to_UL___ ____to_____ ___to_____ ___to_____ ___to_____

1,2-DCA = 1,2-Dichloromethane-d4
DBFM = Dibromofluoromethane
TOL-d8 = Toluene-d8
BFB = Bromofluorobenzene

* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
* If QC limits are not available, use limits of 80 – 120 % for aqueous and 70 – 130 % for solid samples.
Actions:

QUALITY	%R < 10%	%R = 10% - LL	%R > UL
Positive results	J	J	J
Nondetects results	R	UJ	Accept

Surrogate action should be applied:

If one or more surrogate in the VOC fraction is out of specification, but has a recovery of > 10%.
If any one surrogate in a fraction shows < 10 % recovery.

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.

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

Sample ID:__JC33175-1MS/-1MSD_____ Matrix/Level:____Groundwater/low_____

MS OR MSD COMPOUND % R RPD QC LIMITS ACTION

MS/MSD%_recoveries_and_RPD_within_laboratory_control_limits_except_for_described_in_this____
_document._____
_____

_MS/MSD_____n-Propanol_____31____66_-_137/29_____No_action_____
_____
_____
_____
_____

Note: No action taken, professional judgment. No qualification made based on RPD results.

* 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

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

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).

VII. B MATRIX SPIKE/MATRIX SPIKE DUPLICATE

MS/MSD – Unspiked Compounds

It should be noted that Region 2 SOP HW-24 does not specify a MS/MSD criteria for the unspiked compounds in the sample. A %RSD of < 50% has therefore been utilized as professional judgment.

If all target analytes were spiked in the MS/MSD, this review element is not applicable.

List the %RSD of the compounds which do not meet the criteria.

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

COMPOUND	SAMPLE CONC.	MS CONC.	MSD CONC.	% RSD	ACTION

Actions:

* If the % RSD > 50, qualify the positive result in the unspiked samples as estimated (J).
* If the % RSD is not calculated (NC) due to nondetected value, use professional judgment to qualify the 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) ANALYSIS

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

1. LCS Recoveries Criteria

Where LCS spiked with the same analyte at the same concentrations as the MS/MSD? **Yes** or No. If no make note in data review memo.

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

LCS ID COMPOUND % R QC LIMIT

___Recoveries_within_laboratory_control_limits._____

_____

_____

_____

_____

Note:

* 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

All analytes in the associated sample results are qualified for the following criteria.

If 25 % of the LCS recoveries were < LL (or 70 %), qualify all positive results (j) and reject nondetects (R).
If two or more LCS were below 10 %, qualify all positive results as (J) and reject nondetects (R).

2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each 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.

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 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: RPD ± 30% for aqueous samples, RPD ± 50 % for solid samples. If both samples and duplicate are <5 SQL, the RPD criteria is doubled.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
No laboratory/field duplicates analyzed with this data package. MS/MSD % recoveries RPD used to assess precision. RPD within laboratory, generally acceptable and guidance document performance criteria control limits.					

Actions:

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.

If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions apply:

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

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

If both sample and duplicate results are not detected, no action is needed.

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

X. 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.

* Area of +100% or -50% of the IS area in the associated calibration standard.
* Retention time (RT) within 30 seconds of the IS area in the associated calibration standard.

DATE	SAMPLE ID	IS OUT	IS AREA	ACCEPTABLE RANGE	ACTION

Actions:

1. IS actions should be applied to the compound quantitated with the out-of-control ISs

QUALITY	IS AREA < -25%	IS AREA = -25 % TO – 50%	IS AREA > + 100%
Positive results	J	J	J
Nondetected results	R	UJ	ACCEPT

2. If a IS retention time varies more than 30 seconds, the chromatographic profile for that sample must be examined to determine if any false positive or negative exists. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for the sample fraction.

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

XII. SAMPLE QUANTITATION

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

JC33175-1MS

Methanol RF = 10.64

[ ] = (68653)/(10.64)

= 6,452 ppm OK

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

XII. QUANTITATION LIMITS

A. Dilution performed

SAMPLE ID	DILUTION FACTOR	REASON FOR DILUTION

B. Percent Solids

List samples which have ≤ 50 % solids

_____
_____
_____
_____
_____
_____

Actions:

If the % solids of a soil sample is 10-50%, estimate positive results (J) and nondetects (UJ)

If the % solids of a soil sample is < 10%, estimate positive results (J) and reject nondetects (R)

EXECUTIVE NARRATIVE

SDG No:	**JC33175**	Laboratory:	**Accutest, New Jersey**
Analysis:	**SW846-8081B**	Number of Samples:	**3**

Location: BMSMC, Building 5 Area
Humacao, PR

SUMMARY: Three (3) samples were analyzed for selected pesticides (Dieldrin) following method SW846-8081B. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence *Hazardous Waste Support Section SOP No. HW-36A, Revision 0, June, 2015. SOM02.2. Pesticide 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 initial calibration verification within the guidance document performance criteria. Continuing calibration % differences meet the performance criteria in at least one of the two columns. Final calibration verification included in data package. 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: January 12, 2017

SAMPLE ORGANIC DATA SAMPLE SUMMARY

Sample ID: JC33175-1
Sample location: BMSMC Building 5 Area
Sampling date: 6-Dec-16
Matrix: Groundwater

METHOD: 8081B

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Aldrin	0.011	ug/l	1	-	U	Yes
alpha-BHC	0.011	ug/l	1	-	U	Yes
beta-BHC	0.011	ug/l	1	-	U	Yes
delta-BHC	0.011	ug/l	1	-	U	Yes
gamma-BHC (Lindane)	0.011	ug/l	1	-	U	Yes
alpha-Chlordane	0.011	ug/l	1	-	U	Yes
gamma-Chlordane	0.011	ug/l	1	-	U	Yes
Dieldrin	0.011	ug/l	1	-	U	Yes
4,4'-DDD	0.011	ug/l	1	-	U	Yes
4,4'-DDE	0.011	ug/l	1	-	U	Yes
4,4'-DDT	0.011	ug/l	1	-	U	Yes
Endrin	0.011	ug/l	1	-	U	Yes
Endosulfan sulfate	0.011	ug/l	1	-	U	Yes
Endrin aldehyde	0.011	ug/l	1	-	U	Yes
Endrin ketone	0.011	ug/l	1	-	U	Yes
Endosulfan-I	0.011	ug/l	1	-	U	Yes
Endosulfan-II	0.011	ug/l	1	-	U	Yes
Heptachlor	0.011	ug/l	1	-	U	Yes
Heptachlor epoxide	0.011	ug/l	1	-	U	Yes
Methoxychlor	0.021	ug/l	1	-	U	Yes
Toxaphene	0.27	ug/l	1	-	U	Yes

Sample ID: JC33175-1MS
Sample location: BMSMC Building 5 Area
Sampling date: 6-Dec-16
Matrix: Groundwater

METHOD: 8081B

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Aldrin	0.50	ug/l	1	-	-	Yes
alpha-BHC	0.55	ug/l	1	-	-	Yes
beta-BHC	0.64	ug/l	1	-	-	Yes
delta-BHC	0.65	ug/l	1	-	-	Yes
gamma-BHC (Lindane)	0.58	ug/l	1	-	-	Yes
alpha-Chlordane	0.57	ug/l	1	-	-	Yes
gamma-Chlordane	0.57	ug/l	1	-	-	Yes
Dieldrin	0.54	ug/l	1	-	-	Yes
4,4'-DDD	0.52	ug/l	1	-	-	Yes
4,4'-DDE	0.55	ug/l	1	-	-	Yes
4,4'-DDT	0.56	ug/l	1	-	-	Yes
Endrin	0.59	ug/l	1	-	-	Yes
Endosulfan sulfate	0.56	ug/l	1	-	-	Yes
Endrin aldehyde	0.56	ug/l	1	-	-	Yes
Endrin ketone	0.57	ug/l	1	-	-	Yes
Endosulfan-I	0.56	ug/l	1	-	-	Yes
Endosulfan-II	0.54	ug/l	1	-	-	Yes
Heptachlor	0.58	ug/l	1	-	-	Yes
Heptachlor epoxide	0.56	ug/l	1	-	-	Yes
Methoxychlor	0.49	ug/l	1	-	-	Yes
Toxaphene	ND	ug/l	1	-	-	Yes

Sample ID: JC33175-1MSD
Sample location: BMSMC Building 5 Area
Sampling date: 6-Dec-16
Matrix: Groundwater

METHOD: 8081B

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable
Aldrin	0.44	ug/l	1	-	-	Yes
alpha-BHC	0.51	ug/l	1	-	-	Yes
beta-BHC	0.57	ug/l	1	-	-	Yes
delta-BHC	0.58	ug/l	1	-	-	Yes
gamma-BHC (Lindane)	0.52	ug/l	1	-	-	Yes
alpha-Chlordane	0.50	ug/l	1	-	-	Yes
gamma-Chlordane	0.50	ug/l	1	-	-	Yes
Dieldrin	0.49	ug/l	1	-	-	Yes
4,4'-DDD	0.47	ug/l	1	-	-	Yes
4,4'-DDE	0.49	ug/l	1	-	-	Yes
4,4'-DDT	0.46	ug/l	1	-	-	Yes
Endrin	0.52	ug/l	1	-	-	Yes
Endosulfan sulfate	0.50	ug/l	1	-	-	Yes
Endrin aldehyde	0.54	ug/l	1	-	-	Yes
Endrin ketone	0.51	ug/l	1	-	-	Yes
Endosulfan-I	0.50	ug/l	1	-	-	Yes
Endosulfan-II	0.49	ug/l	1	-	-	Yes
Heptachlor	0.50	ug/l	1	-	-	Yes
Heptachlor epoxide	0.52	ug/l	1	-	-	Yes
Methoxychlor	0.44	ug/l	1	-	-	Yes
Toxaphene	ND	ug/l	1	-	-	Yes

DATA REVIEW WORKSHEETS

Project/Case Number:_____JC33175___
Sampling Date:_____12/06/2016____
Shipping Date:_____12/06/2016____
EPA Region No.:_____2_____

REVIEW OF PESTICIDE 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 *Hazardous Waste Support Section SOP No. HW-36A, Revision 0, June, 2015. SOM02.2. Pesticide 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 VOCs included:

Lab. Project/SDG No.: __JC33175_____ Sample matrix: _____Groundwater_____
No. of Samples: _____3_____

Trip blank No.: _____-_____
Field blank No.: _____FB120616_____
Equipment blank No.:____EB120616_____
Field duplicate No.:_____-_____
Field spikes No.:_____-_____
QC audit samples:_____-_____

___X___ Data Completeness
___X___ Holding Times
__N/A__ 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:__TCL_pesticides_list_by_SW846-8081B._Field_and_quipment_blanks_____
_validated_in_another_job._____
_____

Definition of Qualifiers:

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

Reviewer:_Rafael Infante_____
Date:__January_11,_2017_____

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	ACTION
Samples properly preserved. All samples extracted and analyzed within the required criteria.			

Note:

Criteria

Aqueous samples - seven (7) days from sample collection for extraction; 40 days from sample collection for analysis.
Non-aqueous samples – fourteen (14) days from sample collection for extraction; 40 days from sample collection for analysis.

Cooler temperature (Criteria: 4 ± 2 °C): 5.9°C - OK

Actions

Qualify aqueous sample results using preservation and technical holding time information as follows:

a. If there is no evidence that the samples were properly preserved (T = 4°C ± 2°C), and the samples were extracted or analyzed within the technical holding times, qualify detects as estimated (J) and non-detects as estimated (UJ).

b. If there is no evidence that the samples were properly preserved (T = 4°C ± 2°C), and the samples were extracted or analyzed outside the technical holding times, qualify detects as estimated (J) and non-detects as estimated (UJ).

c. If the samples were properly preserved, and were extracted and analyzed within the technical holding times, no qualification of the data is necessary.

d. If the samples were properly preserved, and were extracted or analyzed outside the technical holding times, qualify detects as estimated (J) and non-detects as estimated (UJ). Note in the Data Review Narrative that holding times were exceeded and the effect of exceeding the holding time on the resulting data.

e. Use professional judgment to qualify samples whose temperature upon receipt at the laboratory is either below 2 degrees centigrade or above 6 degrees centigrade.
f. If technical holding times are grossly exceeded, use professional judgment to qualify the data.

Qualify non-aqueous sample results using preservation and technical holding time information as follows:
a. If there is no evidence that the samples were properly preserved (T = 4°C ± 2°C), and the samples were extracted or analyzed within the technical holding time, qualify detects as estimated (J) and non-detects as estimated (UJ).
b. If there is no evidence that the samples were properly preserved (T = 4°C ± 2°C), and the samples were extracted or analyzed outside the technical holding time, qualify detects as estimated (J) and non-detects as estimated (UJ).
c. If the samples were properly preserved, and were extracted and analyzed within the technical holding time, no qualification of the data is necessary.
d. If the samples were properly preserved, and were extracted or analyzed outside the technical holding time, qualify detects as estimated (J) and non-detects as estimated (UJ). Note in the Data Review Narrative that holding times were exceeded and the effect of exceeding the holding time on the resulting data.
e. Use professional judgment to qualify samples whose temperature upon receipt at the laboratory is either below 2 degrees centigrade or above 6 degrees centigrade.
f. If technical holding times are grossly exceeded, use professional judgment to qualify the data.

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

GAS CHROMATOGRAPH WITH ELECTRON CAPTURE DETECTOR (GC/ECD) INSTRUMENT PERFORMANCE CHECK (SECTIONS 1 TO 5)

1. Resolution Check Mixture

Criteria

Is the resolution between two adjacent peaks in the Resolution Check Mixture C greater than or equal to 80.0% for all analytes for the primary column and greater than or equal to 50.0% for the confirmation column? **Yes**? or No?

Is the resolution between two adjacent peaks in the Resolution Check Mixture (A and B) greater than or equal to 60.0%? Yes? or No?

Note: If resolution criteria are not met, the quantitative results may not be accurate due to inadequate resolution. Qualitative identifications may also be questionable if coelution exists.

Action

a. Qualify detects for target compounds that were not adequately resolved as tentatively identified (NJ).
b. Qualify non-detected compounds as unusable (R).

2. Performance Evaluation Mixture (PEM) Resolution Criteria

Criteria

Is PEM analysis performed at the required frequency (at the end of each pesticide initial calibration sequence and every 12 hours)? **Yes**? or No?

Action

a. If PEM is not performed at the required frequency, qualify all associated sample and blank results as unusable (R).

Criteria

Is PEM % Resolution < 90%? Yes? or **No?**

Action

a. a. Qualify detects for target compounds that were not adequately resolved as tentatively identified (NJ).
b. Qualify non-detected compounds as unusable (R).

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

3. PEM 4,4'-DDT Breakdown

Criteria

Is the PEM 4,4'-DDT % Breakdown >20.0% and 4,4'-DDT is detected? Yes? or **No**?

Action

a. Qualify detects for 4,4'-DDT; detects for 4,4'-DDD; and detects for 4,4'-DDE as estimated (J)

Criteria

Is the PEM 4,4'-DDT % Breakdown >20.0% and 4,4'-DDT is not detected Yes? or **No**?

Action

a. Qualify non-detects for 4,4'- DDT as unusable (R)
b. Qualify detects for 4,4'-DDD as tentatively identified (NJ)
c. Qualify detects for 4,4'-DDE as tentatively identified (NJ)

4. PEM Endrin Breakdown

Criteria

Is the PEM Endrin % Breakdown >20.0% and Endrin is detected? Yes? or **No**?

Action

a. Qualify detects for Endrin; detects for Endrin aldehyde; and detects for Endrin ketone as estimated (J)

Criteria

Is the PEM Endrin % Breakdown >20.0% and Endrin is not detected Yes? or **No**?

Action

a. Qualify non-detects for Endrin as unusable (R)
b. Qualify detects for Endrin aldehyde as tentatively identified (NJ)
c. Qualify detects for Endrin ketone as tentatively identified (NJ)

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

5. Mid-point Individual Standard Mixture Resolution -

Criteria

Is the resolution between two adjacent peaks in the Resolution Check Mixture C greater than or equal to 80.0% for all analytes for the primary column and greater than or equal to 50.0% for the confirmation column? **Yes**? or No?

Is the resolution between two adjacent peaks in the Resolution Check Mixture (A and B) greater than or equal to 90.0%? **Yes**? or No?

Note: If resolution criteria are not met, the quantitative results may not be accurate due to inadequate resolution. Qualitative identifications may also be questionable if coelution exists.

Action

a. Qualify detects for target compounds that were not adequately resolved as tentatively identified (NJ).
b. Qualify non-detected compounds as unusable (R).

Criteria

Is mid-point individual standard mixture analysis performed at the required frequency (every 12 hours)? **Yes**? or No?

Action

a. If the mid-point individual standard mixture analysis is not performed at the required frequency, qualify all associated sample and blank results as unusable (R).

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

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:_____12/08/16_____
Dates of initial calibration verification:_____12/08/16_____
Dates of continuing calibration:_____12/14/16_____
Dates of final calibration_____12/14/16_____
Instrument ID numbers:_____GC1G_____
Matrix/Level:_____Aqueous/low_____

DATE	LAB FILE ID#	CRITERIA OUT RFs, %RSD, %D, r	COMPOUND	SAMPLES AFFECTED
Initial and initial calibration verification within the guidance document performance criteria. Continuing calibration % differences meet the performance criteria in at least one of the two columns. Final calibration verification included in data package. No action taken, professional judgment.				

Criteria

Are a five point calibration curve delivered with concentration levels as shown in Table 3 of SOP HW-36A, Revision 0, June, 2015? **Yes**? or No?

Actions

If the standard concentrations listed in Table 3 are not used, use professional judgment to evaluate the effect on the data

Criteria

Are RT Windows calculated correctly? **Yes**? or No?

Action

Recalculate the windows and use the corrected values for all evaluations.

Criteria

Are the Percent Relative Standard Deviation (%RSD) of the CFs for each of the single component target compounds less than or equal to 20.0%, except for alpha-BHC and delta-BHC?

Yes? or No?

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

Are the %RSD of the CFs for alpha-BHC and delta-BHC less than or equal to 25.0%. **Yes**? or No?

Is the %RSD of the CFs for each of the Toxaphene peaks must be < 30% when 5-point ICAL is performed? **Yes**? or No?

Is the %RSD of the CFs for the two surrogates (tetrachloro-m-xylene and decachlorobiphenyl) less than or equal to 30.0%. **Yes**? or No?

Action

a. If the %RSD criteria are not met, qualify detects as estimated (J) and use professional judgment to qualify non-detected target compounds.
b. If the %RSD criteria are within allowable limits, no qualification of the data is necessary

Continuing Calibration Checks

Criteria

Is the continuing calibration standard analyzed at the acceptable time intervals? **Yes**? or No?

Action

a. If more than 14 hours has elapsed from the injection of the instrument blank that begins an analytical sequence (opening CCV) and the injection of either a PEM or mid-point concentration of the Individual Standard Mixtures (A and B) or (C), qualify all data as unusable (R).
b. If more than 12 hours has elapsed from the injection of the instrument blank that begins an analytical sequence (opening CCV) and the injection of the last sample or blank that is part of the same analytical sequence, qualify all data as unusable (R).
c. If more than 72 hours has elapsed from the injection of the sample with a Toxaphene detection and the Toxaphene Calibration Verification Standard (CS3), qualify all data as unusable (R).

Criteria

Is the Percent Difference (%D) within ±25.0% for the PEM sample? Yes? or **No**?

Action
a. Qualify associated detects as estimated (J) and non-detects as estimated (UJ).

Criteria

For the Calibration Verification Standard (CS3); is the Percent Difference (%D) within ± 25.0%? Yes? or **No**?

Action

Qualify associated detects as estimated (J) and non-detects as estimated (UJ).

Criteria

Is the PEM 4,4'-DDT % Breakdown >20.0% and 4,4'-DDT is detected? Yes? or **No**?

Action

a. Qualify detects for 4,4'-DDT; detects for 4,4'-DDD; and detects for 4,4'-DDE as estimated (J)
b. Non-detected associated compounds are not qualified

Criteria

Is the PEM 4,4'-DDT % Breakdown >20.0% and 4,4'-DDT is not detected Yes? or **No**?

Action

a. Qualify non-detects for 4,4'- DDT as unusable (R)
b. Qualify detects for 4,4'-DDD as tentatively identified (NJ)
c. Qualify detects for 4,4'-DDE as tentatively identified (NJ)

Criteria

Is the PEM Endrin % Breakdown >20.0% and Endrin is detected? Yes? or **No**?

Action

a. Qualify detects for Endrin; detects for Endrin aldehyde; and detects for Endrin ketone as estimated (J)
b. Non-detected associated compounds are not qualified

Criteria

Is the PEM Endrin % Breakdown >20.0% and Endrin is not detected Yes? or **No**?

Action

a. Qualify non-detects for Endrin as unusable (R)
b. Qualify detects for Endrin aldehyde as tentatively identified (NJ)
c. Qualify detects for Endrin ketone as tentatively identified (NJ)

A separate worksheet should be filled for each initial curve

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.

CRQL concentration_____0.01_ug/L_____

Laboratory blanks

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
_No_target_analytes_detected_in_method_blanks_at_a_reporting_limit_of_0.01,_0.02,_and_0.25_				
_ug/L_____				

Field/Equipment/Trip blank

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

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

BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

Action Levels (ALs) should be based upon the highest concentration of contaminant determined in any blank. Do not qualify any blank with another blank. The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. No positive sample results should be reported unless the concentration of the compound in the samples exceeds the ALs:

The concentration of non-target compounds in all blanks must be less than or equal to 10 µg/L. The concentration of each target compound found in the method or field blanks must be less than its CRQL listed in the method.

Data concerning the field blanks are not evaluated as part of the CCS process. If field blanks are present, the data reviewer should evaluate this data in a similar fashion as the method blanks.

Specific actions are as follows:

Blank Actions for Pesticide Analyses

Blank Type	Blank Result	Sample Result	Action for Samples
Method, Sulfur Cleanup, Instrument, Field, TCLP/SPLP	Detects	Not detected	No qualification required
	< CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	No qualification required
	> CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL and ≤ blank concentration	Report blank value for sample concentration with a U
		≥ CRQL and > blank concentration	No qualification required
	= CRQL	≤ CRQL	Report CRQL value with a U
		> CRQL	No qualification required
	Gross contamination	Detects	Report blank value for sample concentration with a U

DATA REVIEW WORKSHEETS

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

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

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:_Aqueous_____

Lab Sample ID	Lab File ID	S1 a	S1 b	S2 a	S2 b
JC33175-1	1G130502.D	98	94	66	65
OP99172-BS1	1G130501.D	86	85	45	45
OP99172-MB1	1G130500.D	90	91	42	42
OP99172-MS	1G130503.D	87	88	52	54
OP99172-MSD	1G130504.D	79	77	46	48

Surrogate Compounds	Recovery Limits
S1 = Tetrachloro-m-xylene	26-132%
S2 = Decachlorobiphenyl	10-118%

(a) Recovery from GC signal #1
(b) Recovery from GC signal #2

Note: Surrogate recoveries within laboratory control limits.

Actions:

a. For any surrogate recovery greater than 150%, qualify detected target compounds as biased high (J+).
b. Do not qualify non-detected target compounds for surrogate recovery > 150 %.
c. If both surrogate recoveries are greater than or equal to 30% and less than or equal to 150%, no qualification of the data is necessary.
d. For any surrogate recovery greater than or equal to 10% and less than 30%, qualify detected target compounds as biased low (J-).
e. For any surrogate recovery greater than or equal to 10% and less than 30%, qualify non-detected target compounds as approximated (UJ).
f. If low surrogate recoveries are from sample dilution, professional judgment should be used to determine if the resulting data should be qualified. If sample dilution is not a factor:

i. Qualify detected target compounds as biased low (J-).
ii. Qualify non-detected target compounds as unusable (R).

g. If surrogate RTs in PEMs, Individual Standard Mixtures, samples, and blanks are outside of the RT Windows, the reviewer must use professional judgment to qualify data.
h. If surrogate RTs are within RT windows, no qualification of the data is necessary.
i. If the two surrogates were not added to all samples, MS/MSDs, standards, LCSs, and blanks, use professional judgment in qualifying data as missing surrogate analyte may not directly apply to target analytes.

Summary Surrogate Actions for Pesticide Analyses

Criteria	Action*	
	Detected Target Compounds	Non-detected Target Compounds
%R > 150%	J+	No qualification
30% < %R < 150%	No qualification	
10% < %R < 30%	J-	UJ
%R < 10% (sample dilution not a factor)	J-	R
%R < 10% (sample dilution is a factor)	Use professional judgment	
RT out of RT window	Use professional judgment	
RT within RT window	No qualification	

* Use professional judgment in qualifying data, as surrogate recovery problems may not directly apply to target analytes.

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

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

Data for MS and MSDs will not be present unless requested by the Region.
Notify the Contract Laboratory Program Project Officer (CLP PO) if a field blank was used for the MS and MSD, unless designated as such by the Region.

> **NOTE:** 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:____JC33175-1MS/MSD____ Matrix/Level:__Groundwater___

The QC reported here applies to the following samples: Method: SW846 8081B
JC33175-1

Note: MS/MSD sample analyzed with this data package. % recoveries and RPD within laboratory control limits.

Action

No qualification of the data is necessary on MS and MSD data alone. However, using professional judgment, the validator may use the MS and MSD results in conjunction with other QC criteria and determine the need for some qualification of the 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 _____

LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

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

1. LCS Recoveries Criteria

LCS Spike Compound	Recovery Limits (%)
gamma-BHC	50 – 120
Heptachlor epoxide	50 – 150
Dieldrin	30 – 130
4,4'-DDE	50 – 150
Endrin	50 – 120
Endosulfan sulfate	50 – 120
trans-Chlordane	30 – 130
Tetrachloro-m-xylene (surrogate)	30 – 150
Decachlorobiphenyl (surrogate)	30 – 150

LCS concentrations:____0.25_ug/l;_____

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

LCS ID COMPOUND % R QC LIMIT

_____%_recovery_and_RPD_within_laboratory_control_limits._____

_____

_____

_____

Note:

Action

The following guidance is suggested for qualifying sample data for which the associated LCS does not meet the required criteria.

a. If the LCS recovery exceeds the upper acceptance limit, qualify detected target compounds as estimated (J). Do not qualify non-detected target compounds.

b. If the LCS recovery is less than the lower acceptance limit, qualify detected target compounds as estimated (J) and non-detects as unusable (R).

c. Use professional judgment to qualify data for compounds other than those compounds that are included in the LCS.

d. Use professional judgment to qualify non-LCS compounds. Take into account the compound class, compound recovery efficiency, analytical problems associated with each compound, and comparability in the performance of the LCS compound to the non-LCS compound.

e. If the LCS recovery is within allowable limits, no qualification of the data is necessary.

2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each 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.

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

FLORISIL CARTRIDGE PERFORMANCE CHECK

NOTE: Florisil cartridge cleanup is mandatory for all extracts.

Criteria

Is the Florisil cartridge performance check conducted at least once on each lot of cartridges used for sample cleanup or every 6 months, whichever is most frequent? Yes? or No? **N/A**

Criteria

Are the results for the Florisil Cartridge Performance Check solution included with the data package? Yes? or No? **N/A**

Note: If % criteria are not met, examine the raw data for the presence of polar interferences and use professional judgment in qualifying the data as follows:

Action:

a. If the Percent Recovery is greater than 120% for any of the pesticide target compounds in the Florisil Cartridge Performance Check, qualify detected compounds as estimated (J). Do not qualify non-detected target compounds.
b. If the Percent Recovery is greater than or equal to 80% and less than or equal to 120% for all the pesticide target compounds, no qualification of the data is necessary.
c. If the Percent Recovery is greater than or equal to 10% and less than 80% for any of the pesticide target compounds in the Florisil Cartridge Performance Check, qualify detected target compounds as estimated (J) and non-detected target compounds as approximated (UJ).
d. If the Percent Recovery is less than 10% for any of the pesticide target compounds in the Florisil Cartridge Performance Check, qualify detected compounds as estimated (J) and qualify non-detected target compounds as unusable (R).
e. If the Percent Recovery of 2,4,5-trichlorophenol in the Florisil Cartridge Performance Check is greater than or equal to 5%, use professional judgment to qualify detected and non-detected target compounds, considering interference on the sample chromatogram.

Note: State in the Data Review Narrative potential effects on the sample data resulting from the Florisil Cartridge Performance Check analysis not yielding acceptable results.

Note:_ No information for florisil cartridge performance check included in data package. There is evidence tahtFlorisil cartridge was used for sample extraction/clean-up. No qualification of the data performed, professional judgment.

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

GEL PERMEATION CHROMATOGRAPHY (GPC) PERFORMANCE CHECK

NOTE: GPC cleanup is mandatory for all soil samples.

If GPC criteria are not met, examine the raw data for the presence of high molecular weight contaminants; examine subsequent sample data for unusual peaks; and use professional judgment in qualifying the data. Notify the Contract Laboratory Program Project Officer (CLP PO) if the laboratory chooses to analyze samples under unacceptable GPC criteria.

Action:

a. If the Percent Recovery is less than 10% for the pesticide compounds and surrogates during the GPC calibration check, the non-detected target compounds may be suspect, qualify detected compounds as estimated (J).
b. If the Percent Recovery is less than 10% for the pesticide compounds and surrogates during the GPC calibration check, qualify all non-detected target compounds as unusable (R).
c. If the Percent Recovery is greater than or equal to 10% and is less than 80% for any of the pesticide target compounds in the GPC calibration, qualify detected target compounds as estimated (J) and non-detected target compounds as approximated (UJ).
d. If the Percent Recovery is greater than or equal to 80% and less than or equal to 120% for all the pesticide target compounds, no qualification of the data is necessary.
e. If high recoveries (i.e., greater than 120%) were obtained for the pesticides and surrogates during the GPC calibration check, qualify detected compounds as estimated (J). Do not qualify non-detected target compounds.

Note: State in the Data Review Narrative potential effects on the sample data resulting from the GPC cleanup analyses not yielding acceptable results.

Note:_ No information for performance of GPC cleanup included in data package. No qualification of the data performed, professional judgment.

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

TARGET COMPOUND IDENTIFICATION

Criteria:

1. Is Retention Times (RTs) of both of the surrogates and reported target compounds in each sample within the calculated RT Windows on both columns? **Yes**? or No?

2. Is the Tetrachloro-m-xylene (TCX) RT ±0.05 minutes of the Mean RT (RT) determined from the initial calibration and Decachlorobiphenyl (DCB) within ±0.10 minutes of the RT determined from the initial calibration? **Yes**? or No?

3. Is the Percent Difference (%D) for the detected mean concentrations of a pesticide target compound between the two Gas Chromatograph (GC) columns within the inclusive range of ± 25.0 %? **Yes**? or No?

4. When no analytes are identified in a sample; are the chromatograms from the analyses of the sample extract and the low-point standard of the initial calibration associated with those analyses on the same scaling factor? **Yes**? or No?

5. Does the chromatograms display the Single Component Pesticides (SCPs) detected in the sample and the largest peak of any multi-component analyte detected in the sample at less than full scale. Yes? or **No**?

6. If an extract is diluted; does the chromatogram display SCPs peaks between 10-100% of full scale, and multi-component analytes between 25-100% of full scale? Yes? or No? **N/A**

7. For any sample; does the baseline of the chromatogram return to below 50% of full scale before the elution time of alpha-BHC, and also return to below 25% of full scale after the elution time of alpha-BHC and before the elution time of DCB? **Yes**? or No?

8. If a chromatogram is replotted electronically to meet these requirements; is the scaling factor used displayed on the chromatogram, and both the initial chromatogram and the replotted chromatogram submitted in the data package. Yes? or **No**?

Action:

a. If the qualitative criteria for both columns were not met, all target compounds that are reported as detected should be considered non-detected.

b. Use professional judgment to assign an appropriate quantitation limit using the following guidance:

i. If the detected target compound peak was sufficiently outside the pesticide RT Window, the reported values may be a false positive and should be replaced with the sample Contract Required Quantitation Limits (CRQL) value.

ii. If the detected target compound peak poses an interference with potential detection of another target peak, the reported value should be considered and qualified as unusable (R).

c. If the data reviewer identifies a peak in both GC column analyses that falls within the appropriate RT Windows, but was reported as a non-detect, the compound may be a false negative. Use professional judgment to decide if the compound should be included.

Note: State in the Data Review Narrative all conclusions made regarding target compound identification.

d. If the Toxaphene peak RT windows determined from the calibration overlap with SCPs or chromatographic interferences, use professional judgment to qualify the data.

e. If target compounds were detected on both GC columns, and the Percent Difference between the two results is greater than 25.0%, consider the potential for coelution and use professional judgment to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interfering compound is indicated, use professional judgment to determine how best to report, and if necessary, qualify the data according to these guidelines.

f. If Toxaphene exhibits a marginal pattern-matching quality, use professional judgment to establish whether the differences are due to environmental "weathering" (i.e., degradation of the earlier eluting peaks relative to the later eluting peaks). If the presence of Toxaphene is strongly suggested, report results as presumptively present (N).

GAS CHROMATOGRAPH/MASS SPECTROMETER (GC/MS) CONFIRMATION

NOTE: This confirmation is not usually provided by the laboratory. In cases where it is provided, use professional judgment to determine if data qualified with "C" can be salvaged if it was previously qualified as unusable (R).

Action:

a. If the quantitative criteria for both columns were met (≥ 5.0 ng/µL for SCPs and ≥ 125 ng/µL for Toxaphene), determine whether GC/MS confirmation was performed. If it was performed, qualify the data using the following guidance:

i. If GC/MS confirmation was not required because the quantitative criteria for both columns was not met, but it was still performed, use professional judgment when evaluating the data to decide whether the detect should be qualified with "C".

ii. If GC/MS confirmation was performed, but unsuccessful for a target compound detected by GC/ECD analysis, qualify those detects as "X".

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

COMPOUND QUANTITATION AND REPORTED CONTRACT REQUIRED QUANTITATION LIMITS (CRQLS)

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

JC33175-1 Matrix Spike alpha-BHC RF = 1.138

[ ] = $(141.1 \times 10^6)(50)/(236.2 \times 10^6)(1.138)$
= 26.3 ppb Ok

Action:

a. If sample quantitation is different from the reported value, qualify result as unusable (R).
b. When a sample is analyzed at more than one dilution, the lowest CRQLs are used unless a QC exceedance dictates the use of the higher CRQLs from the diluted sample.
c. Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" and its corresponding value on the original reporting form and substituting the data from the diluted sample.
d. Results between the MDL and CRQL should be qualified as estimated (J).
e. Results less than the MDL should be reported at the CRQL and qualified (U). MDLs themselves are not reported.
f. For non-aqueous samples, if the percent moisture is less than 70.0%, no qualification of the data is necessary. If the percent moisture is greater than or equal to 70.0% and less than 90.0%, qualify detects as estimated (J) and non-detects as approximated (UJ). If the percent moisture is greater than or equal to 90.0%, qualify detects as estimated (J) and non-detects as unusable (R) (see Table).

Percent Moisture Actions for Pesticide Analysis for Non-Aqueous Samples

Criteria	**Action**	
	Detected Associated Compounds	**Non-detected Associated Compounds**
% Moisture < 70.0	No qualification	
70.0 < % Moisture < 90.0	J	UJ
% Moisture > 90.0	J	R

List samples which have ≤ 50 % solids

Note: 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.

Dilution performed

SAMPLE ID	DILUTION FACTOR	REASON FOR DILUTION

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

FIELD DUPLICATE PRECISION

NOTE: In the absence of QAPP guidance for validating data from field duplicates, the following action will be taken.

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. Identify which samples within the data package are field duplicates. Estimate the relative percent difference (RPD) between the values for each compound. If large RPDs (> 50%) is observed, confirm identification of samples and note difference in the executive summary.

Sample IDs: _____-_____ Matrix:_____-_____

COMPOUND	SQL ug/L	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 the required criteria of < 50 %.					

Actions:

a. Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.

b. If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions apply:

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

ii. If one sample value is not detected and the other is greater than 5x the SQL and the SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

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

iv. If both sample and duplicate results are not detected, no action is needed.

OVERALL ASSESSMENT OF DATA
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.

Note: The Contract Laboratory Program Project Officer (CLP PO) must be informed if 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).

Overall assessment of the data: Results are valid; the data can be used for decision making purposes.